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# Rural Electricity

## ECONOMICS AND EDUCATION

IN all parts of the country letters are appearing in local newspapers from indignant dwellers in rural areas complaining of the exorbitant demands of the electricity authorities when they are asked to extend their service to the writers' farms and houses. The demands take the form either of a direct capital contribution or a guarantee of a minimum annual payment for electricity. This correspondence raises the bogey of rapacious authorities grinding the faces of the rural poor and, regrettably, this view is fostered by many newspapers.

There is, of course, another aspect of this business. In numerous instances the complainants misunderstand or imperfectly comprehend the supply authorities' quotations, which upon explanation are seen to be not so terrible as they appeared. But, setting these aside, the authorities have a case. One reason for the "co-ordination" of electricity supply was that a large area authority would be able to set off losses in country districts against the gains secured in the towns. But there is a limit to the amount which urban consumers should be called upon to bear in subsidizing rural supplies.

### Contributions to Cost

Some think that direct grants from the Exchequer would be a reasonable alternative, but farmers, at least, are already favourably treated in this respect. Also the rural population, although not overpaid, are far better off than they used to be. It is therefore not unreasonable to expect both farmers and their workers, and other residents in the remoter areas, to contribute a fair share of the cost of supplying them with electricity.

As we suggested in our leading article of 12th August, a rural extension cannot pay for itself unless it is fully used. It is too much to expect an Area Board to erect a mile or two of line merely to serve a few lamps and radio sets. This point has just been made by Sir William Robertson, chairman of the Northern Ireland Electricity Supply Board. He pointed out that the large majority of the farmers who had been connected to the Board's system seemed to have made no effort to find out the many uses for electricity on farms, and were content to install lighting and a few domestic appliances.

### Self Help

Sir William Robertson said: "One man had installed eight lighting points on his farm with a 25W lamp at each point. This meant that he would continue to live in semi-darkness although he had modern lighting facilities at his disposal." He concluded by saying that unless farmers helped themselves and their neighbours rural electrification in the area would never be economic.

We do not insist that farmers should "find out the many uses for electricity." It is a part of the Electricity Boards' duties to show farmers what can be done electrically and to convince them that it will pay them to make full use of the service. With the aid of the British Elec-

trical Development Association the Boards have done a great deal in this way. We suppose that no agricultural show this year of any size has been without its electrical display at which demonstrations have been given of the uses of electricity in farming. Mention must not be omitted of the Electrical Contractors' Association's exhibit at some of these shows, which is a new venture indicating the contractors' desire to do their share in this educational work.

**FAIR COMPETITION**

We are glad to see that the electrical contractors have welcomed the declaration of its policy in electrical contracting and retailing made last week by the British Electricity Authority. This, incidentally, received quite an unusual amount of attention in the London and provincial newspapers. Mr. L. C. Penwill, director and secretary of the Electrical Contractors' Association, claims that his members are responsible for about 85 per cent of the installation work carried out in the country. He says that they have for many years co-operated with the electricity supply industry to secure the maximum papers. Mr. L. C. Penwill, director and it is hoped that the principles of fair competition now established will secure a continuance of this co-operation and so ensure adequate and efficient service to the public.

**INDUSTRIAL PRODUCTION**

The latest statistics of industrial production published by the Board of Trade, those for May, show that only two of the principal groups bettered the performance of the "engineering, shipbuilding and electrical goods" section. With the 1946 level as a basis (100) the figure of production for engineering, etc., was 147; this compares with a 1948 monthly average of 127. For industry as a whole the figure was 134 (against 121), and for all manufacturing industries 138 (against 127).

**TENANTS' CHOICE**

One wartime rule forbade the installation of electricity where other means of lighting, heating and cooking were available. Although the same rule applied to gas it was the advancing electricity supply industry which was more affected. Now, four years or more after the end of the war, a similar rule is apparently being applied by the Ministry of Health. Tenants on two Southport Council estates (196 out of 220) wish to have electric lighting installed, but the Ministry will not sanction this unless it is assured that the present gas lighting system is unsatisfactory. The Council is to give this assurance, but has deferred consideration of a petition for electricity from the tenants of another estate. Surely it is time that people were again able to make a free choice, especially in the matter of lighting.

**RIGHT OF SELECTION**

There is probably something to be said for a trade union's insistence that only members of the union shall be employed in certain work, but it is perhaps going too far when the union wants to stipulate which members shall be engaged. The matter arises out of a dispute in the film industry recently submitted to the National Arbitration Tribunal. Film producers claimed the right to say which particular men on a register of available employees should be selected; the Electrical Trades Union insisted that men should be taken from the register in strict order. The Tribunal decided that the employers were entitled to select their men. We can sympathize with the Union's desire to give all its members an equal chance, but we think that the Tribunal's decision was a proper one.

**GAS TOO!**

Several of the new Gas Boards have announced increases in the price of the therm and are endeavouring to scotch the contention of a number of newspapers that this is the first result of nationalization. We must confess to a little satisfaction that this is happening to gas. During the past year the emphasis has been on dearer electricity and a false impression has been created that gas is much cheaper. Both Gas and Electricity Boards, however, are incurring unearned odium, for prices were "pegged" too long under the former dispensation. Nevertheless both kinds of authority must watch the position carefully and make ends meet by increased efficiency rather than by the simpler expedient of raising charges—a habit of the National Coal Board.

## Growing Popularity of Electrical Methods

# Apple Storage

THOUGH many varieties of apples keep reasonably well for quite a long time in an ordinary atmosphere, their life in prime condition can be extended very considerably with the aid of special stores in which the composition and temperature of the atmosphere are carefully controlled. By this means the apple farmer can, if he wishes, hold back his produce until well after the autumn glut period and release it at a time when the demand is greater and the prices obtainable are (Ministry of Food controls permitting) higher.

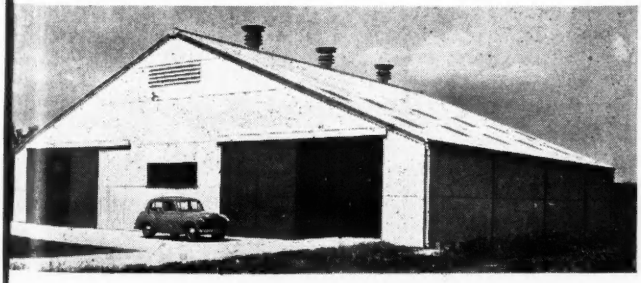
The conditions under which apples keep best vary considerably according to variety. When in store apples absorb oxygen and give off carbon dioxide. If the carbon dioxide content of the atmosphere becomes excessive the apples go bad.

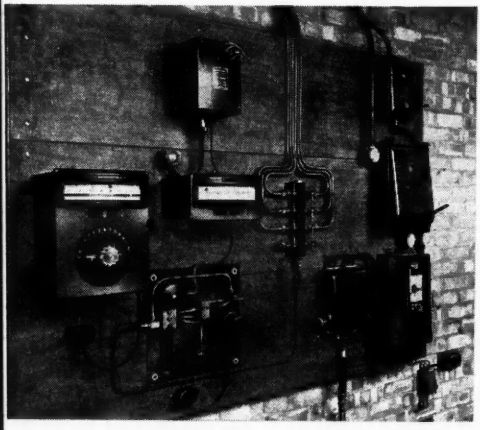
Many varieties, such as "Newton Wonder" and "Blenheim Orange" can be reasonably well stored in ordinary air at temperatures varying from 34 to 40 deg F by means of straightforward cold storage methods. Other varieties (e.g., "Bramley's Seedlings") need up to 10 per cent $CO_2$, while still further varieties (e.g., "Cox's Orange Pippins" and "Laxton's Superb") require in addition independent control of both oxygen and $CO_2$.

Air normally contains 21 per cent oxygen and practically no $CO_2$; the nitrogen can be disregarded as it has no effect on the apples. If control of the $CO_2$ only is required this can be arranged by admitting to the store an appropriate quantity of fresh air. If, however, control of both oxygen and $CO_2$ is necessary, use has to be made of a $CO_2$ absorber or "scrubber." This consists of a tank of caustic soda through which the air from the store is pumped and then returned.

Very considerable activity has been taking place recently in the Fens Sub-Area of the Eastern Electricity Board (manager: Lt.-Colonel A. E. Knights, D.S.O., M.C., A.M.I.E.E., A.M.I.Mech.E.) in the designing and equipping of these apple stores. Five stores ranging

The newly erected apple store at Mr. F. W. Everitt's farm at Wilburton





**Instrument board, including 12-point distance thermometer and $CO_2$ indicator**

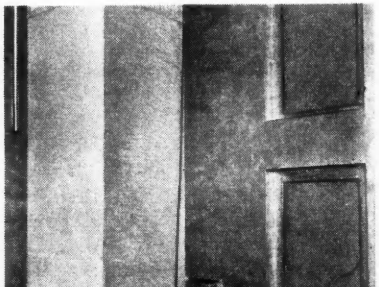
in size from 50 tons to 300 tons capacity have been completed and work on a similar number is in hand, several being due for completion in time for the coming season. Having its own architects' department, the Sub-Area is in a position to assist the farmer in designing a complete scheme laid out to ensure maximum efficiency and convenience of operation, including the important but often overlooked provision of adequate space for handling the apples. Advice on special problems is also freely given by the Low Temperature Research Station, Cambridge.

A few days ago, accompanied by Mr. H.J. Unwin, assistant commercial officer, and Mr. L. E. Cozens, refrigeration engineer, Fens Sub-Area, we visited a number of these stores, some completed and some in course of erection. The basic design in each case is the same, and the first one we saw, that of Mr. F. W. Everitt at Wilburton, is typical of them all.

Here in an entirely new building 75 ft square have been provided six 50-ton storerooms. These, arranged in two rows of three, back to back, occupy most of the centre portion of the building, space under cover being left at each side for the lorries containing the apples to run in and, with the aid of an electrically-driven elevator, unload the fruit into store. Also under cover in the front of the building is additional handling room. Here, mounted on the wall midway between the two rows of storerooms, is an instrument board incorporating a 12-point distance thermometer (two points per room) and a $CO_2$ indicator coupled to a manifold covering the various sampling lines; both of these were made by the Cambridge Instrument Co., Ltd.

Each of the storerooms is 20ft by 19ft by 16ft high. The brick walls have a 4in cavity which is packed with mineral wool, 12-14 lb/cu ft. The interior is made gastight by the application of bitumen to which a small quantity of cement has been added to form a paste. The final coat is brushed on and the surface is finished off with two coats of aluminium paint. The wooden ceiling is lined with steel sheets overlapped 1½in and the joints packed with petroleum jelly to render them gastight. To permit both high and low level packing of the fruit, two 3ft wide cold room doors are installed, one above the other. These are provided with gastight plates which are held in position by means of wing nuts.

Raised from the concrete floor (which is dished and drained) on bricks placed edgewise are wooden duckboards on which the cases of apples rest. The wood is specially treated to prevent dry rot.



**The interior of an apple store showing air duct, two-level doors, flexible cable for distance thermometer and (left top) the sampling line**

In the centre of the room is a rectangular duct 3 ft sq from the bottom of which, under and through the duckboard, circulates a current of cooled air. The air is cooled by being blown by 24in fans ($\frac{3}{4}$ h.p., 900 r.p.m., three-phase motors) over a direct expansion cooling coil constructed of $1\frac{1}{4}$in bore steel tubing 600ft long, spirally wound and situated within the duct. The coil is connected to a "Coldrator" type I.R.630B 3 h.p. air-cooled condensing unit made by the International Refrigerator Co., Ltd. This incorporates a compressor of the two-cylinder vertical reciprocating type. Employing methyl chloride refrigerant and running at medium speed (550 r.p.m.) its heat extraction to maintain temperature at 20 deg F (75 deg F ambient temperature) is 20,000 B.Th.U/hr.

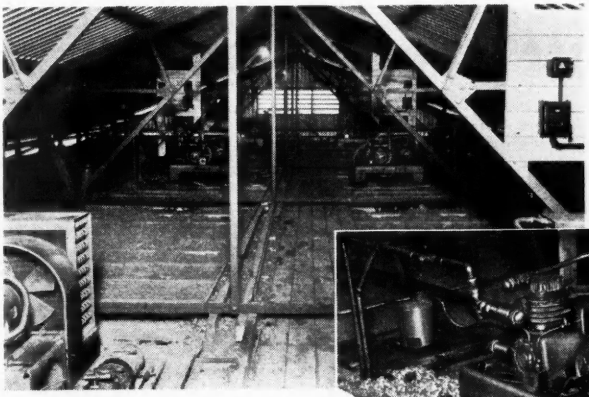
Mounted on the walls of the storeroom, about half-way down, are a sampling line and a thermostat which automatically controls the condensing unit. Two distance thermometers on flexible leads are normally placed at coolest and warmest positions, namely the floor and the top layer of crates.

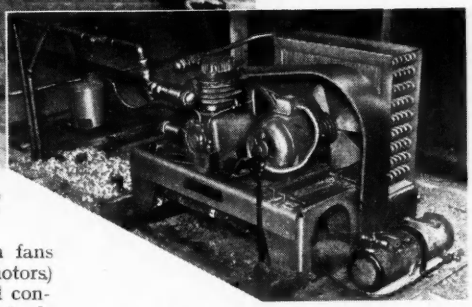
A "scrubber" is not provided in this plant but, as in all the installations now being carried out, arrangements are made for adding it easily, should the farmer desire to store apples requiring it.

Out of the apple storage season some of these stores have been used successfully for keeping plums for a short period and also for "holding back" flowers for a few days.

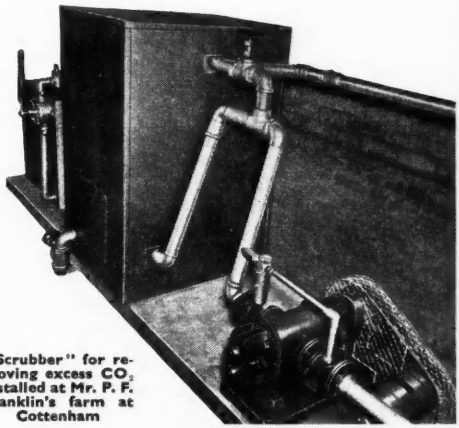
To enable us to see the actual method of construction of the walls, etc., we next visited two stores in course of erection, both about 100 tons capacity.

An example of the conversion of existing buildings to apple storage was seen at Mr. P. F. Franklin's farm at Cottenham. Here a barn has been laid-out to accommodate two 15-ton and two 20-ton stores. As it is required to store "Cox's Orange Pippins" a "scrubber" has been provided operated by a $\frac{1}{2}$ h.p., 725 r.p.m. motor.





[ The refrigeration plant and fans are installed in the loft over the store rooms



"Scrubber" for removing excess $CO_2$ installed at Mr. P. F. Franklin's farm at Cottenham

# *Views on the News*

**By REFLECTOR**

SOME of my readers may be among those people, mentioned in the *Manchester Guardian* recently, who are uncertain of the pronunciation of Joule. It is suggested that many more foreigners will be puzzled now that the joule is to replace the calorie as a heat unit. As Joule was a Manchester man, inquiries naturally went in the direction of that city but there it was found that "jool" "jowl" or "jole" were employed indiscriminately. Research has determined that the name derives from the family name of Youlgreave in Derbyshire, but a correspondent says that this is pronounced locally as "Yolegrave." To some collateral branches of the family "jool" seems to be the most acceptable pronunciation, but one branch appears to have preferred "jole" in the last century.

★ ★ ★

I have already said that I consider it a mistake to force "quarterly" meters on people who would prefer the prepayment type. Although wages have increased since 1938 the working-class housewife still finds it hard to put aside money for electricity each week. Of course prepayment meters are expensive and must be paid for by the consumer, but a great many consumers will not mind this. This question arose recently at a meeting of a Community Association in Scotland. Opinion was generally in favour of prepayment meters, but one member suggested that if they could not be provided it might be possible to fix "small banks" to the meters so that tenants could deposit so much a week towards the quarterly bill.

★ ★ ★

For several months now I have been endeavouring unsuccessfully to trace the manufacturers of an apparently especially rare specimen of a rod-type fire element. It was fitted in a wall panel fire supplied with my house and neither the fire nor the element seems to provide any clue unless the cryptic symbols "64A" on the latter mean anything. Everywhere I go all over the country I carry the remains in my pocket in the hope of tracking it down, and this has become such a habit that I feel almost unclad should I by any chance forget it. With nearly a couple of hundred different types of fire element in existence it is perhaps not surprising that I have not come across it. Incidentally, none of the so-called "universal" models is suitable. Eventually such sources of inconvenience and annoyance will, I suppose, be eliminated by the standardization of elements supplemented by the records of the new E.D.A.-B.S.I. Testing House. In the meantime it looks as though I shall have to make the best of a bad job and convert my fire to accommodate some other type of element.

★ ★ ★

Complaints of excessive estimates for rural electricity supplies should be accepted with caution. Recently, a correspondent to the *Eastern Daily Press* alleged that he had been asked for a capital contribution of £500 for an extension of the line to his premises. Mr. J. A. Sumner, manager of the Eastern Board's Norfolk Sub-Area, has investigated the matter, and writes to the paper to say that there was never any question of a capital contribution. The Board asked for an annual line rental of £31 for seven years, to be reduced by an amount equal to half the revenue on normal tariffs. The service would be provided free of charge. The offer was conditional upon the agreement of a near neighbour of the correspondent to take a supply on similar terms.

★ ★ ★

From another part of East Anglia, Kersey, comes a report of further approval of overhead lines. In this case a correspondent says that the lines will not necessarily mar the beauty of this old-world village. He says: "Those who pay fleeting visits to the village and admire its antiquity should refrain from passing resolutions on what Kersey should be allowed to have or, in this case, be prepared to contribute towards the extra cost of laying the lines underground."

# Engineering and Marine Exhibition

## INCREASED PRODUCTION EFFICIENCY

WHEN we visited the Engineering and Marine Exhibition at Olympia last week it soon became clear that this was truly the most comprehensive and impressive display of the series. The general theme of the show, when compared with pre-war exhibitions, has changed and the products displayed are more of a general engineering nature than marine. The exhibition does, however, illustrate the wide diversity of engineering goods manufactured in this country and how they can best be put into service in any part of the world.

### Keen Competition

There also appears to be keener competition between manufacturers of the same kind of equipment, and probably for this very reason organized parties of exhibitors' employees from factories and offices are being admitted to the exhibition free. This arrangement is obviously introducing a healthy competitive element into industry, for workers are comparing with interest the machines which they helped to make with similar products from other factories, thereby gaining a much broader view of the industry to which they belong.

One point worth mentioning is that although many of the exhibits will be familiar in appearance to most engineers and the general atmosphere of the show much is about the same as it was in 1947, there is a difference and an important one. On examining individual machines it can be seen that there is a marked improvement in workmanship; much attention is being paid to both internal and external finish, and manufacturers are taking full advantage of newly developed materials as they become available.

The exhibition was declared open by Sir John Anderson who was thanked for doing so by Mr. H. W. Bosworth (chairman of the B.E.M.A. Council) speaking on behalf of the electrical industry.

### Inaugural Luncheon

At the subsequent inaugural luncheon, Sir John Anderson presiding, the success of the exhibition was proposed by Sir Percy Lister, who remarked that the number of exhibitors (530 this year) exceeded by 75 per cent the pre-war maximum. They should take courage from that fact for there was too great a tendency to be despondent. It was time to tell the country of the gravity of the situation and of the steps that needed to be taken. If the facts were simply stated, the country would respond and provide the answer which the world awaited. There had lately been references to rising costs; there were some weak spots that needed attention, but the manufacturers were not able to control all costs, not for instance those of electricity, gas and transportation.

Sir Percy said that he had recently returned from the United States as a member of the Dollar Export Board. He had obtained a very clear view of the situation and of the steps that needed to be taken. The Board had not long been established, but it hoped before long to have some concrete proposals to make to all industry. The problem would not be solved by the United States and Canada buying from this country alone; some of their products were needed by Great Britain, so there was a two-way pipeline and the British end of the pipe needed to be bigger.

### Productive Efficiency and Salesmanship

Sir John Anderson responded with the observation that much had lately been said about production efficiency and salesmanship which the exhibition showed were the key to national recovery. They must not form too hasty conclusions from a first view of the exhibits because it was not so much innovation, which was apt to create restrictive practices, as the intelligent development of what they already possessed which was really needed.

Lt.-Col. H. Riggall then welcomed the guests from home and overseas, on whose behalf Dr. H. Roxbee Cox and Senor Don Manuel Bianchi (Chilean Ambassador) responded.

Apart from those products mentioned in the review of exhibits in last week's issue of this journal several other items of electrical interest are to be seen at Olympia. For example, Everett, Edgcumbe & Co., Ltd., display a wide range of electrical instruments, protective equipment and the well known "Synclock" marine clock system, in which the slave clocks on board a

ship are arranged to gain or lose a predetermined amount each day of the voyage to compensate for the vessel's change in position.

Process controllers, remote indication and control equipments are shown by Evershed & Vignoles, Ltd., together with servo-mechanisms, switchboard and portable measuring instruments and a new series of "Megger" testers.

Examples of portable instruments of the kind used in the radio and allied industries are to be seen on the stand of the Automatic Coil Winder & Electrical Equipment Co., Ltd. A Douglas double bank multi-winder is also shown. This machine is capable of winding twenty-four coils simultaneously, covering a winding width of 3oin, using 46-30 s.w.g. and operating at speeds up to 3,000 r.p.m.

The main exhibit of George Kent, Ltd., is a complete panel of boiler instruments. Other exhibits include working models of the "Mark 20" air-operated controller and a ring balance flow controller. "Multelec" recorders and controllers relating to temperature, pH, $CO_2$ and conductivity are also shown.

Marine engineers will be interested in a buoy lamp shown by Venner Time Switches, Ltd., while electrical engineers will appreciate the company's wide range of meters, time-switches, delay relays, clock movements and similar mechanisms.

# All-electric Poultry Farming

## LARGE-SCALE INCUBATION

WHAT is claimed to be the largest accredited poultry farm under individual management, that of Mr. H. I. Everitt, at Wilburton, Cambridgeshire, has recently had further additions to its electrical equipment. Comprising 7,000 layers, it is completely electrified and has just had two 6,000-egg "Primula" incubators installed to supplement the two 3,000-egg and one 2,000-egg units already in use, provision also being made for two further 6,000-egg machines. All these incubators incorporate electric heaters as well as fans. Fluorescent lighting has been fitted throughout the incubator room.

In an adjoining room a "Coldrator" refrigerator is used to store table birds. To grind his chicken food Mr. Everitt finds an "Essex" mill a great boon and he has further simplified operations and lightened his work by providing a small elevator for taking the corn from a low bin at ground level up to the hopper of the mill.

**Incubator room at Mr. Everitt's poultry farm at Wilburton and (right) an elevator is employed to feed corn into the "Essex" mill**

# *Personal and Social*

## NEWS OF MEN AND WOMEN OF THE INDUSTRY

IT is announced that **Mr. M. T. Edge,** A.M.I.Mech.E., M.I.P.E., has been elected a director of Hall Telephone Accessories, Ltd.

**Mr. D. St. C. Barrie,** A.M.I.E.E., sales and service superintendent with the Merseyside and North Wales Electricity Board at Runcorn and Widnes, has been appointed district commercial officer, Warrington, with that Board. Mr. Barrie was formerly with the Portsmouth and Fareham electricity undertakings, and during the last war served as captain in the Royal Engineers. Subsequently he became a deputy consumers' engineer with the St. Helens (Lancs) Electricity Department. He is a member of the Executive Committee of the Liverpool Section of the Illumination Engineering Society.

Mr. D. St C. Barrie

**Mr. R. L. Varney,** A.M.I.E.E., a research engineer of Marconi's Wireless Telegraph Co., Ltd., has been awarded the Norman Keith Adams Prize for the most outstanding contribution of the year to the Radio Society of Great Britain. His paper was entitled "Further Advances in Television Interference Suppression."

**Mr. W. C. Lane** has been appointed manager of the Radio Department of Brown Brothers, Ltd., in succession to **Mr. A. J. Wade,** who takes up a sales appointment. Mr. Lane has, during recent years, been the radio and electrical service manager of the company. **Mr. H. W. Webster** continues as manager of the Electrical Department.

**Mr. R. E. Cox,** A.M.I.E.E., A.M.Inst.T., A.M.I.Mech.E., who began his career with the London Passenger Transport Board and latterly has been deputy general manager of the Bolton Transport Department, has been appointed transport manager at St. Helens. He has been secretary to the Public Service Vehicle Maintenance Committee of the Ministry of Transport Northern Traffic Area.

**Mr. T. F. P. Bell** has recently resigned his appointment as chief designer with Thorn Electrical Industries, Ltd., and is now working on his own account at 7, Pond Road, Blackheath, London, S.E.3, as an industrial designer-consultant specializing in electrical and engineering products.

**Mr. H. Standring** has been appointed personnel manager by Oldham & Son, Ltd. He was formerly assistant works manager with Cooke & Ferguson, of Openshaw, Manchester.

Over sixty pensioners, all of whom were formerly workers at one of the Henley cable factories at North Woolwich or Gravesend, of **W. T. Henley's Telegraph Works Co., Ltd.,** had a happy day by the sea on 23rd August, as guests of the company. They were conveyed by coach to Margate, where Sir Montague Hughman (chairman) and other officials of the Henley organization joined them at lunch. Sir Montague welcomed the pensioners, and Mr. G. C. Wyman, formerly of Henley's North Woolwich Works, and Mr. C. F. Maxwell, formerly of Henley's Gravesend Works, expressing appreciation of the company's generosity. Mr. H. J. Hodges, chief labour officer (fifty-two years' service), and Mr. A. W. McArthur, M.I.E.E., works manager (Woolwich) (fifty years' service) also spoke.

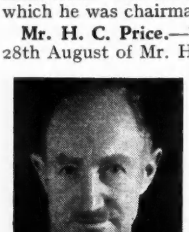
At Henley's swimming gala on 19th August, Mr. F. W. M. Anderson, director and general manager, accepted from Sir Montague Hughman, the City Livery Cup on behalf of head office. This cup is awarded annually to the office or works of the company achieving the highest number of points in sporting events. Head office had a small lead of two points at the commencement of the gala, which was very closely contested. The decision rested with the final event which resulted in head office gaining a one-point victory.

## Obituary

**Mr. Julius Frith.**—The death occurred recently in his seventy-seventh year of Mr. Julius Frith, M.Sc., M.I.E.E., M.Cons.E., the well-known consulting engineer, who until his retirement, was partner in the firm of Cramp & Frith. Mr. Frith was in his earlier years head of the electrical design and testing departments of Mather & Platt, Ltd., and was also lecturer on specifications and estimates in Victoria University, Manchester. His literary contributions were

numerous and included papers on the electric arc to the Literary and Philosophical Society and the Physical Society, and in collaboration with the late Prof. E. H. Lamb he wrote a paper on "The Breaking of Shafts due to Oscillations set up at Critical Speeds," for which he was awarded an extra premium by the Institution of Electrical Engineers. He was also the author of "Alternating Current Design," and (with E. Buckingham) "Vibration in Engineering." He was for many years secretary and was a past chairman of the North Western Centre of the I.E.E., and he was a member of the Institution Wiring Rules Committee. He was also a member of the Council of the Manchester Association of Engineers of which he was chairman in 1932.

**Mr. H. C. Price.**—The death occurred on 28th August of Mr. H. C. Price, manager of the Birmingham and district sales office of George Ellison, Ltd. Mr. Price, who leaves a widow, was born in 1887 and was educated at Bedford School. He served his apprenticeship with the old British Westinghouse Co. (now Metropolitan - Vickers) with whom he remained until he joined the staff of George Ellison, Ltd., in 1919, the Birmingham and district sales office being opened by Mr. Price shortly after he joined the company. He served with the Royal Engineers throughout the 1914-18 war and was commissioned with the rank of Lieutenant. Mr. Price was a member of the Warwickshire and South Staffordshire Branch of the Association of Mining Electrical and Mechanical Engineers and the Birmingham Electric Club. The funeral took place at Perry Barr Crematorium on 1st September.



**The late Mr. H. C. Price**

**Mr. F. Clark.**—The death occurred on 24th August of Mr. Frank Clark, M.Inst.C.E., M.I.Mech.E., a member of the board of Simon-Carves, Ltd. Mr. Clarke joined the company in 1920, was appointed a director in 1926 and retired in 1945. For the last twenty years of his active career he was the head of the Power Plant Department. After his retirement he continued to serve the firm as a part-time director and consultant until the end of his life.

**Mr. John David Gibson,** who has died in Cheshire at the age of forty-three, was North-Western Area representative of the International Marine Radio Co. He started his career with Siemens Bros. & Co., Ltd., in 1925 and after serving at sea joined the International Marine Radio Co. in 1933. He later became manager of the firm's Southampton depot and in 1942 was appointed North-Western Area representative.

**Mr. A. O. Roberts,** member of the Merseyside & North Wales Electricity Board and chairman of the Consultative Council, died suddenly at his home, Sutton Hall, Little Sutton, Cheshire on Thursday last week. He was a member of the Liverpool City Council and before the nationalization of the electricity supply industry, deputy chairman of the city's Electric Lighting & Power Committee.

**Mr. E. E. Briggs.**—The death occurred on 25th August of Mr. Ernest E. Briggs, M.I.Mech.E., A.M.I.E.E., F.Inst.F., chairman and governing director of Ernest E. Briggs, Ltd., engineers and contractors.

**Mr. James Mollison Doe,** late Scottish representative of the Electric Construction Co., Ltd., Wolverhampton, died recently at Holmlea Cottage, Errol.

## Wills

**Mr. R. E. Hattersley,** chairman and managing director of Hattersley (Ormskirk), Ltd., brassfounders, and chairman of Erskine, Heap & Co., Ltd., who died on 2nd May last, left £981,685 gross, (£952,221 net).

**Mr. N. R. Campbell,** Sc.D., formerly of Trinity College, Cambridge, and the G.E.C. Laboratories, Wembley, who died on 18th May last, left £21,198 gross (£20,926 net).

**Mr. C. E. Woodrow,** assistant sales manager of the Mechanical Dept., Metropolitan-Vickers Electrical Co., Ltd., who died on 27th April last, left £11,764 gross (£11,667 net).

**Mr. J. W. Wells,** for twenty-eight years with the lamp and lighting advertising dept. of the British Thomson-Houston Co., Ltd., who died on 7th April last intestate, left £1,982 gross (£1,943 net).

**Sir Frank Robert Simpson,** Bt., C.B., T.D., D.L., chairman of Newcastle & District Electric Lighting Co., Ltd., and Waste Heat & Gas Electrical Generating Stations, Ltd., who died on 29th April, left £33,960 gross (£30,735 net).

**Mr. B. Russell,** M.A., B.Sc., A.M.I.E.E., a principal scientific officer at the atomic-energy research establishment, Harwell, who died on 8th March, intestate, left £2,366 gross (£2,325 net).

**Admiral H. W. Grant,** C.B., late chairman and managing director of the Marconi group of companies, who died on 14th April, left £19,984 gross (£19,327 net).

# Correspondence

**Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents**

## Transport Power Station Wages

YOUR leaderette of 26th August—"Transport Power Men"—will certainly earn the gratitude of the staffs concerned. It may or may not help to bring relief from the grave injustice suffered by these men, but it will at least bring to the notice of our more fortunate brethren in the industry the state of affairs existing in the power stations operated by the London Transport Executive.

The technical staffs have on numerous occasions requested that their salaries and conditions be brought to the same level as those enjoyed by the majority of the industry. These requests have been disregarded.

Small wonder then that not only is there unrest in the "wages" staffs, but that the technical staffs, too, are suffering under a sense of injustice. Their work generally is the same as in the stations of the B.E.A. and in many instances more arduous due to under-staffing.

There is, therefore, no justifiable reason for the dissimilarity between the salaries and conditions enjoyed by the power station staffs of the B.E.A. and those doled out to the unfortunates in the transport stations. "ANOTHER SUFFERER."

## Electricity Boards' Purchasing

A NOTICEABLE feature of the interesting National Supply Surveys which have so far appeared in the *Electrical Review* has been the almost complete lack of recognition of the importance of the purchasing function on the part of the Boards and Divisions concerned. Where purchasing is mentioned at all in their organization charts, it appears to be regarded as a secondary consideration.

Without knowing the exact figures, I imagine that the amount which all Boards spend on capital equipment and revenue items must form a very substantial part of their total expenditure. It would, therefore, seem to be a matter for review by the Electricity Boards whether, in the interests both of themselves and of the nation (bearing in mind the necessity for cheap electricity to be available as widely as possible), they should not fall into line with modern industrial practice by making proper provision for purchasing in its varied aspects to be represented on the same level as the equivalent functions of the secretary, accountant, chief engineer and chief commercial officer. This was common prevesting date practice in the case of power companies, and surely our nationalized supply industry cannot afford to be less efficient than other industries by departing from it.

The failure to make such provision is bound to have its effect upon the efficiency with which the Electricity Boards' purchasing operations are conducted. Instances are already being quoted in well-informed circles of orders being placed on terms which compare unfavourably with those secured before vesting date and of the advantages of co-ordinated purchasing being ignored. The industry's apparent lack of a progressive purchasing policy is also not unnaturally causing concern to manufacturers who, because of shortage of information, are unable to plan production on the most efficient lines.

It would be interesting to read the views of Boards and manufacturers on this subject.

J. R. BLINCH,
*Secretary*, Purchasing Officers' Association.
*London, W.C.2.*

[We have made it clear in each of the "Surveys" that we are dealing with the *Areas* and not the operations of the Electricity Boards and Divisions.—EDITORS, *Electrical Review*].

## International Electrotechnical Vocabulary

IN the report given in the *Electrical Review* of 19th August of the actions of the I.E.C. Advisory Committee on Nomenclature, it is stated that in the revised edition of the "International Electrotechnical Vocabulary" the use of Esperanto is to cease.

This is a most regrettable step and will

greatly reduce the value and usefulness of the dictionary to me personally and to many Esperantist technicians over the whole world. The step is, furthermore, in direct opposition to the trend of scientific thought at the present moment, when many abstracting and translating bodies are showing an interest in Esperanto and the international language question.

Even non-Esperantists should realize that it is only by the adoption of an international language for technical work that the present delay and difficulty in the distribution of scientific information can be eliminated.

N. R. SMITH, B.Sc. (Elec. Eng.).
*London, W.2.*

## The Sign of Reactive Power

YOUR contributor "Sigma" has done a service in raising this question in the *Electrical Review* of 19th August. The original American sign of leading positive was adopted about 1933 after consulting engineering opinion by ballot. The reversed convention has been adopted after a further expression of opinion by American engineers, stimulated by the A.I.E.E. committee report cited by "Sigma" (*Electrical Engineering*, Nov., 1946).

So far as I know the matter has not been adequately discussed in this country of recent years and it is the subject of a good deal of confused thought. Many engineers are not even aware that one has a choice of sign: nevertheless the choice is not entirely free, as in ascribing a sign to reactive power one necessarily decides certain other conventions, as pointed out in the article.

In contributing something to the discussion I should like, first, to endorse "Sigma's" remark that practical engineers will support the new lagging positive convention. I think he has done less than justice to the practical aspects and I should like to add some comments.

The old convention is based upon the use of voltage as reference vector. This seems the natural thing to do in power circuits and it is certainly the appropriate method for constructing circle diagrams and the transmission line charts based on these diagrams. In general one can say that for vector computations on paper the leading positive sign is more convenient.

However, in visualizing the operation of a complete system the reverse is true. To a first approximation the flow of watts and vars can be regarded as independent, with the active component dependent upon phase angle differences (in a mainly inductive system) and the reactive component upon voltage differences. A clear appreciation of reactive power flow is then obtained on a d.c. basis, with "wattless" flowing from points of higher to points of lower voltage. The effect of excitation changes in synchronous machines, of tap changes on transformers, of the "generation" of vars in capacitance or their "consumption" in reactors, is apparent at once. To load despatchers and system designers such an appreciation is invaluable. One would imagine also that it would help to solve many mysteries for students.

My personal view is that the two conventions will continue to be used where appropriate, as in the past. But I hope an effort will be made to keep them apart. It is merely confusing to talk of a synchronous condenser generating leading vars when over-excited and still "generating" lagging vars when under-excited. In fact the terms "lag" and "lead" are overworked and overrated. What is the p.f. of a synchronous condenser of zero losses, or of an idling generator?

G. LYON, B.SC.(ENG.),
A.M.I.E.E., ASSOC. A.I.E.E.
*London, N.W.10.*

## A Dangerous Injunction

BY this time readers of the *Electrical Review* may regard the writer as having a "bee in his bonnet" or a one-track mind.

However, recently I purchased a small immersion heater for a doctor friend and, although this piece of apparatus seems to be of excellent manufacture, I was dismayed to observe a small tag (which I enclose) attached to it, reading: "Earth wire cut short if not required."

Now, if this apparatus is obtainable by anyone, who is to say when or when not the earth wire is required? I consider such an injunction to buyers of such apparatus to be extremely dangerous, and have acquainted the manufacturers accordingly. ALEX. MILNE.
*Glasgow.*

# Multi-Speed Induction Motors

## *Interaction of Independent Windings*

By
**THOMAS MILLAR**

WHEN the stator of an induction motor has two or more independent windings, one of which is excited, e.m.f.s. are set up in the others and if a closed circuit exists circulating currents are possible. Such a closed circuit occurs when the unexcited winding contains parallel circuits or is connected in delta.

Referring to Fig. 1, successive coil groups in one particular phase are spaced at 0, 180, 0, 180, etc., electrical degrees with respect to polage of the particular winding. Alternate groups are connected in reverse, so that treating the vector

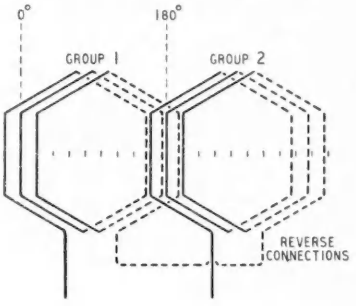



**Fig. 1.—Successive coil groups in each phase are spaced at 0, 180, 0, 180, etc., electrical degrees with respect to polage of the winding**

circle as unity and 180 deg as $\frac{1}{2}$, the successive vectors of the groups are 0, $-\frac{1}{2}$, 0, $-\frac{1}{2}$, etc. The minus sign indicates the reversed coils, and a coil group at $-\frac{1}{2}$ (or $-$ 180 deg) has an effective vector at 0. In other words a coil group at 180 deg but connected as usual in reverse acts in the same way as a similar group at 0 deg connected normally. The $-\frac{1}{2}$ notation is retained to study the effect of interaction of other fields.

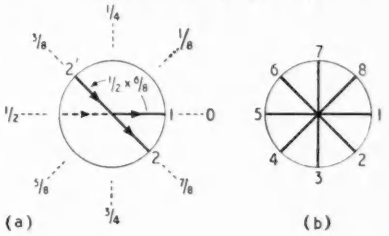
Now, consider the effect produced on this winding by a field of different polage, as when the other winding of a two-winding arrangement is excited. The first coil group is assumed to be fixed at 0. The second group, instead of being at $-\frac{1}{2}$, will be at some vector angle less than this if the excited winding has fewer poles, and vice versa.

If one winding has eight poles and the other or excited one six, then the electrical displacement of group 2 from group 1 is $180 \times 6/8$, or $1/2 \times 6/8 = -3/8$. Removing the negative sign means translating this vector 180 deg, bringing it to the 7/8 position (see Fig. 2).

In a similar manner group 3 will be found to be at the 6/8 position in the six-pole field.

The complete set of eight coil-groups, for this winding, will be represented by

**Fig. 2.—Vectors of groups 1 and 2 of an 8-pole winding in a 6-pole field (a) and complete diagram for the eight groups (b)**




eight vectors equally spaced round the circle (see Fig. 2). Since these vectors represent the voltages induced in each coil group when under the influence of the six-pole field, inspection shows that, if the coil groups are equal, the aggregate voltage will be zero since each vector

has one to oppose it. More precisely, the vector polygon is closed.

Should the successive coil groups be unequal, as, for example, with $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$, etc., slots per pole per phase, or with a single layer winding having an odd number of slots per pole per phase, this condition can also be studied from the vector diagram. In this case groups 1, 3, 5 and 7 will be equal and the vectors will balance. Similarly 2, 4, 6 and 8 will balance. This means that the six-pole field will induce no resultant e.m.f. in the eight-pole winding in the case of integral slots per pole per phase, or with an (integer $+\frac{1}{2}$).

Fractional slot windings, e.g., $2\frac{4}{5}$ slots per pole per phase may be examined in

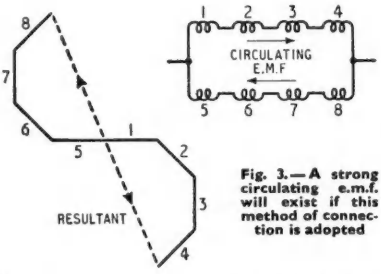



**Fig. 3.—A strong circulating e.m.f. will exist if this method of connection is adopted**

the same way, but any generalization is outside the scope of this article.

Should the eight-pole winding under discussion have parallel circuits various possibilities can arise. For example, with two parallel circuits and assuming equal coil groups the arrangements may be connected in three ways. (a) Coil groups 1, 3, 5, 7 in the first circuit and 2, 4, 6, 8 in the second. (b) Groups 1, 2, 5, 6 in the first circuit, and 3, 4, 7, 8 in the second. (c) Groups 1, 2, 3, 4 in the first circuit, and 5, 6, 7, 8 in the second circuit.

Inspection shows that in methods (a) and (b) each circuit contains opposing coil groups. Consequently either method can be adopted without fear of induced currents from the six-pole field. With method (c), however, a very strong circulating e.m.f. will exist (see Fig. 3) which would lead to disaster if adopted.

Another condition in the case of the eight-pole winding requiring examination, should two parallel circuits be necessary, is when there are unequal coil groups as, for example, when there are $3\frac{1}{2}$ slots per pole per phase and alternate coil groups have three and two slots respectively. Similarly, when a single-layer ("mush" or "basket") winding has three slots per pole per phase the alternate groups have two coils and one coil respectively. In such cases the odd vectors have one value and the even vectors another. Consequently, in circuits containing four groups the vector polygon must be considered in that light.

If the parallels are connected as in method (a) it is obvious that the first circuit is different from the second. It is unsatisfactory to connect in this way since the eight-pole winding would be unbalanced, notwithstanding the fact that there would be zero circulation under six-pole excitation. Method (b) is the one to choose as it is satisfactory in both respects.

To generalize, the vectors of a winding of $2p_1$ poles under the influence of a $2p_2$ field obey the following series:—

$$o_1 \frac{p_2-p_1}{2p_1} \ldots\ldots (n-1) \frac{(p_2-p_1)}{2p_1}$$

Fig. 4 gives in chart form the vector systems for the pole numbers up to 12.

As an example in the use of the vectors consider a 6/8-pole motor with the six-pole winding of equal coil groups connected as three parallel circuits. It was originally connected with groups 1 and 2, 3 and 4, 5 and 6 forming the three circuits, i.e., adjacent poles were in series. The vectors produce a resultant (see Fig. 5) which indicates that a large voltage difference exists between X, Y and Z. This was testified by a high loss when the eight-pole winding was excited. The six-pole winding was then re-connected with 1 and 4, 2 and 5, 3 and 6, as the three circuits and no further trouble was experienced.

Another case concerns a 6/12-pole motor. The six-pole winding had 72 slots, four slots per pole per phase and pitched 1-12, i.e, one slot short of a full pitch. It should be noted here that if the winding had been full-pitched no voltage would have been generated in the twelve-pole field but the slight chording was enough to cause trouble. The winding was arranged as two parallel circuits. Referring to Fig. 4, it can be seen that

vectors 1, 3 and 5 directly oppose 2, 4 and 6, and since there are three coil groups in each circuit it is impossible to select three groups that are unaffected by the twelve-pole field. The winding was therefore rewound for three parallel circuits with an increased number of turns per coil. It was a simple matter to avoid circulating currents by connecting any odd and even pair in series.

A third example is the common case of a three-speed motor with one winding tapped to give n poles with two parallel circuits and 2n poles with all the coils per phase in series. To make it more concrete, take, for instance, a 6/8/12-pole motor, the 6/12-pole winding being connected in delta to give twelve poles and tapped to give six poles, two parallels

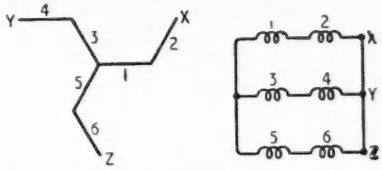
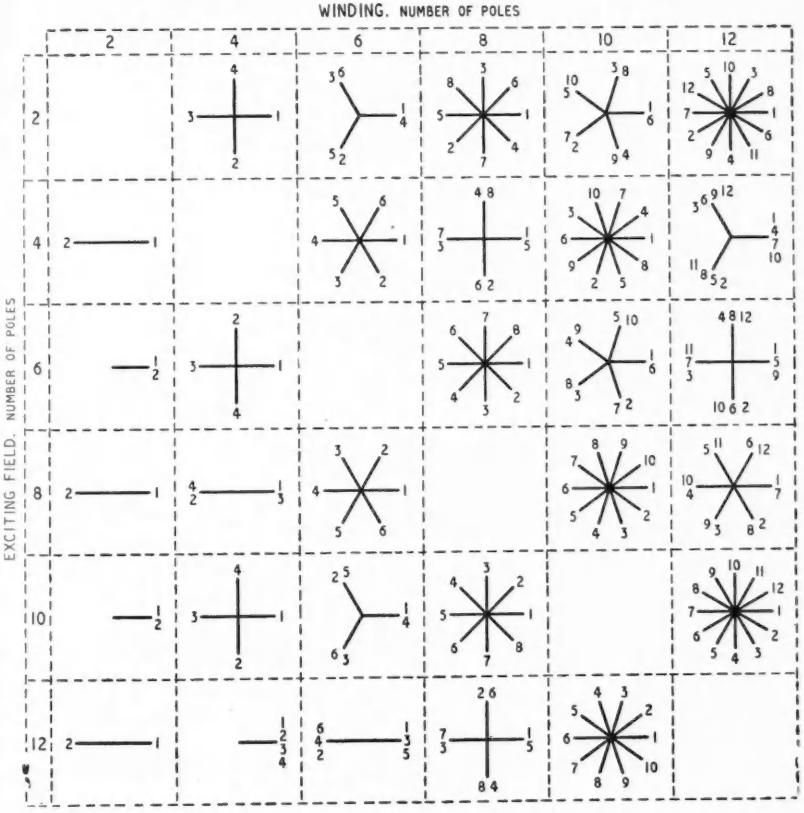



**Fig. 5.—Circulating currents are present when a 6/8-pole motor is connected in this way**

in star (see Fig. 6). The important point to notice is that, treated as a 12-pole winding, there are only six coil groups per phase, spaced at 360 electrical

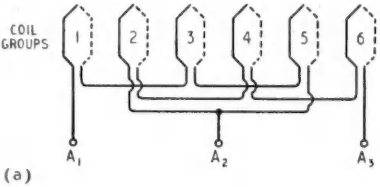
**Fig. 4.—Vector systems for motors with up to twelve poles**



degrees. This is a necessary result of the convertibility to six poles.

So far the effect of harmonics in the excited field has not been considered, but it should be done in every case. If, for example, the excited winding has eight poles, the effect of the 3rd, 5th, 7th, 9th, etc., harmonics can be studied by treating the excited winding as if it had 24, 40, 56, 72 poles.

Reverting to the 6/8/12-pole case and considering the effect of the eight-pole winding and its harmonics on the other winding (treated as twelve-pole with coil groups at 360 deg) it is found that the



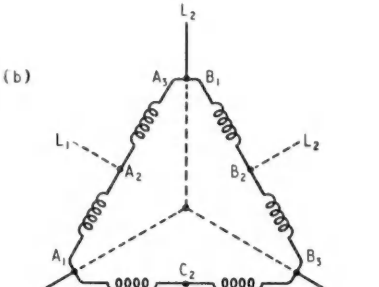




**Fig. 6.—A 6/8/12-pole motor with the 6/12-pole winding connected in delta to give twelve poles and tapped to give six poles, two parallels in star**

fundamental, 5th and 7th harmonics induce no voltage in the 6/12-pole winding.

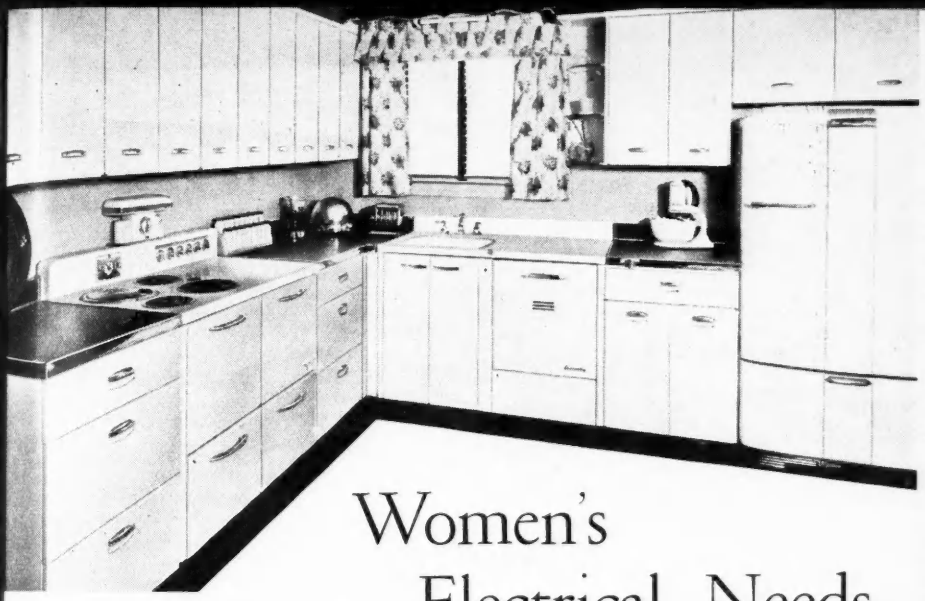
The 3rd harmonic, however, induces a definite voltage. The phase leads of the 6/12-pole winding are spaced at 120 deg, and in the 3rd harmonic field (24 poles) the phases are at $120 \text{ deg} \times \frac{24}{12} = 240$ deg, which means that the phase voltages cancel out and no circulation occurs.

In the case of the 9th harmonic the phase leads are at $120 \text{ deg} \times \frac{9 \times 8}{12} = 0$ deg. It can therefore be assumed that if the 9th harmonic is of appreciable magnitude in the eight-pole field, circulating currents will appear. It is usual in such a case to arrange for the delta to be opened at one point when the other winding is in use, but in practice this precaution is not always justified.

Since there are so many possible combinations of poles and circuits it is dangerous to generalize, and every winding must be considered suspect until proved otherwise. With straightforward two-speed machines, however, which have equal coil groups, a closed delta single circuit winding may be used unless the ratio of the number of poles, reduced to its lowest terms, results in a fraction with numerator and denominator both odd numbers.

## Brazilian Water Power

THE Commercial Relations and Exports Department of the Board of Trade has been informed of a proposed water power scheme, likely to be undertaken in the State of Minas Geraes. This will involve the harnessing of a tributary of the upper Sao Francisco River, and the main distribution centres for the power so produced will be Bello Horizonte, the capital of the State, and Conselheiro, Lafayette, in an iron and manganese mining district, to the south. The scheme is to be a joint undertaking of the Federal and State Governments; it forms part of the plan for the economic development of the Sao Francisco Valley, for which a Federal Commission has been set up. The preliminary plans for the Fecho do Funil dam and power station were recently submitted by the joint study group of Federal and State engineers to the Federal Ministry of Agriculture. The ultimate aggregate rating of the installed plant will be 170,000 h.p. in four units, with a 150,000 kVA transformer house, and one transmission line of four circuits at 110,000 V, of 28 km to Bello Horizonte and another of two circuits at 125,000 V, of 80 km to the south. The initial stage will provide for the installation of two generating units with Francis turbines, of 42,500 h.p. each, and half of the capacity of the transformer house, transmission lines and terminal substations, at a total cost of Cr$319 millions.



# Women's Electrical Needs

By MARY GILBERT*

## *American Ideas which we might Adopt or Adapt*

HAVING just returned from an extensive tour of the United States —embracing twenty-seven of the forty-eight, from the Pacific Coast to the industrial East—I find it impossible to escape inevitable mental comparisons between the alert attitude of mind and keen feminine bias in sales psychology over there, extending throughout all consumer fields, and our own frustrated position, resulting from damped-down enthusiasm and cautious campaigning.

Hitherto, much of this kind of "back-pedalling" has been unavoidable. But now it would seem imperative, for the healthy maintenance of our export trade alone, that some recognizable link between pleasing the home market as well as the overseas customer might be established as eminently desirable.

Or, am I barking up the wrong tree? Has home demand been thoroughly sounded in regard to performance and styling relative to daily living? (I wish I could believe it.) Perhaps creative design-for-selling has weakened since home austerities stressed prolonged standardization? If so, we surely face a new "low" in drabness and comfortless equipment against which women have a right to protest.

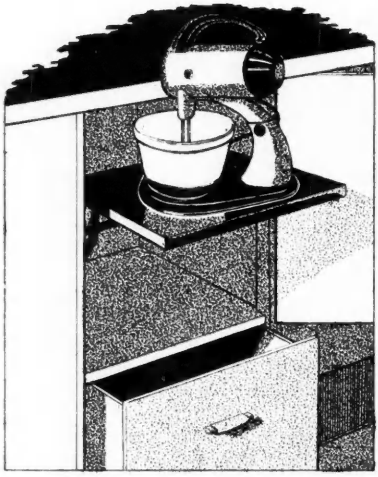
Many of our prestige-established manufacturers are producing not only adventurous designs but really lovely fittings, in spite of the precarious conditions of supply and materials; but it would seem that more effective use of existing

* Miss Gilbert is Women's Press Liaison and Public Relations Officer to the British Electrical Development Association.

**Our title picture: "Closed-in" kitchens are correct in America these days. For those appliances remaining in surface use—mixer, toaster, coffee percolator, etc.—steamproof plastic cloth covers are available. The modern electric range has three surface units (radiant sheathed elements) and a well cooker, which provides a fourth unit when required. Five controlled or "infinitely variable" heats are provided on all units and both ovens are thermostatically controlled. Timers for switching the oven on or off at pre-determined hours are also standard fittings. Integral with sink units are dish-washers, and often garbage disposal devices are built into the waste pipe**

materials might be made with greater understanding of home requirements. Certainly, closer co-ordination needs to be established between design and performance of many British electrical appliances and the needs of the women for whom they are intended. But that should not sound so surprising, for the majority of them were originally marketed as "designs" from ten to twelve years ago, and family living has been revolutionized since 1938.

Electrically speaking, we stand at the



**One enterprising firm provides a strong wooden platform within the housing unit, which slides out and elevates the mixer to correct working height. Replacing it after use is equally automatic and simple**

peak of opportunity, with close on eleven million homes electrified, out of our twelve million "family units," and these are ripe for development. For all her streamlined luxury, America only boasts 35,205,000 wired homes for her 41½ million families. But she is a youthfully minded, uninhibited, striding nation, planning and delivering much that her women want and busy on designs and prototypes for their prospective needs in two years' time. In the United States women's needs are not merely studied—they are anticipated.

Meanwhile, slowly recovering, we see in Britain a new generation of home makers, who, barely remembering the amenities of living before 1938, appreciate, none the less, a clear-cut styling and, from war service alone, can readily assess the domestic versatility of the electric motor and the practical convenience of a time switch. Now is our challenge, and if we are going out to meet it, we shall have to begin, as America does, with the potential purchasers—the women. And that for manufacturers and "merchandizers" entails some serious study, social research and practical reasoning.

For instance, 7,078,000 British women are still engaged in civil employment, according to the Ministry of Labour figures for June this year. A large majority of these women have homes to run—people at home to cook, wash, and house-clean for—in addition to their jobs. America has 18,500,000 women working, of whom 46 per cent are married, with homes, and another 16 per cent widowed or divorced, but presumably with homes to attend to. American Bureau of Labour reports describe these working wives as cooking all the family meals and doing most of the laundrywork as well as the house cleaning. But there is a wide range of electrical appliances now available there, at not too heavy a cost, to help them carry on their two-part job. Facts must first be ascertained—for the answer lies more in the planning and design of these appliances than in their "luxury" finish or detailed execution.

## Detailed Studies

To study the market designers have to consider the daily lives of the potential customers and the way they will use their appliances—and where. For instance, which section of the cooker they will use most and for what meals—and when. Factors such as working away from home and cooking at night; or baking twice a week; or making heavy demands on "surface units" etc., all reflect on the amenities of a cooker, the size of oven desired and the dimensions, as well as the number, of boiling plates.

Speaking of "surface units"—as America styles the top heating sections—we never seem to provide these adequately; how many cookers from necessity find their niche in British homes with

only two boiling plates? Speed heating and simmer controls are catered for in the simplest way in the U.S.A. No longer is the solid plate installed—I did not see one in my travels from coast to coast. Everywhere are the quick-heating sheathed radiant coils—convenient and current saving—with direct contact to saucepan. No special pans are needed, to add to the initial expenditure, and no special instructions on residual heat. Five-heat switching, or infinitely variable controls, secure the desired heating accuracy to the finest simmer. What is even more valuable for initiates—the glow provides visual satisfaction, so helpful in cookery. These things are all on the credit side.

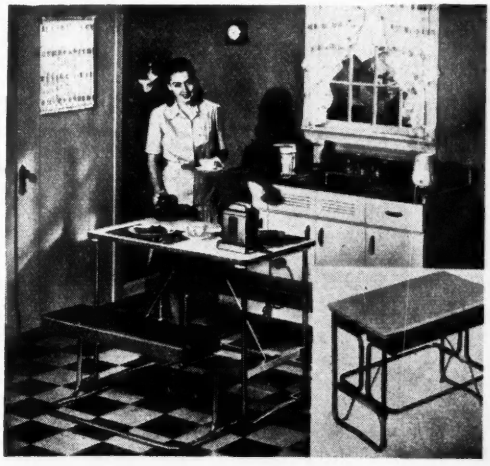
## Elaborate but Easy Control

While on "ranges"—I wish some of our more conservative cooker designers could tour the plants and displays I viewed, for I feel that they would be impressed. Latest American ranges have push-button controls—like a radio—five speeds of heating to each surface unit. Bright colours, shining through the clear plastic "buttons" tell the cook at a glance—from the other side of the kitchen—which unit is on, and at what heat. No more turning of switch knobs—no adjustments to make and all these controls are set on a dashboard ten inches above the cooking surface so there is no groping behind hot utensils to find the push-button. Built-in fluorescent lights, clocks and "timers," as well as thermostatic controls, are regular features of these ranges. Many of them have alternative uses for the well-cooker. By fitting a pressure lid on a two-purpose container, pressure cooking can be carried out within the stove surface. Four surface units are provided, as the well-cooker heat unit can be raised to the surface for action when necessary.

Though the deep well is unlikely to prove popular with us, I feel that many thoughtful features in American cookers would translate to our terms. Higher-level ovens for instance, drop-down doors with wider, grippable handles, interior lighting and greater storage space on the cooker itself. The horizontal-type cooker is a permanent favourite of course, for additional work space becomes available on the cooker-top, with the grouping of top-heating to one side, so little room is lost.

Even more impressive is the laundry story; 67 per cent of wired homes have electric washers—or 23,742,000 installed washers—and that in spite of efficient laundry services.

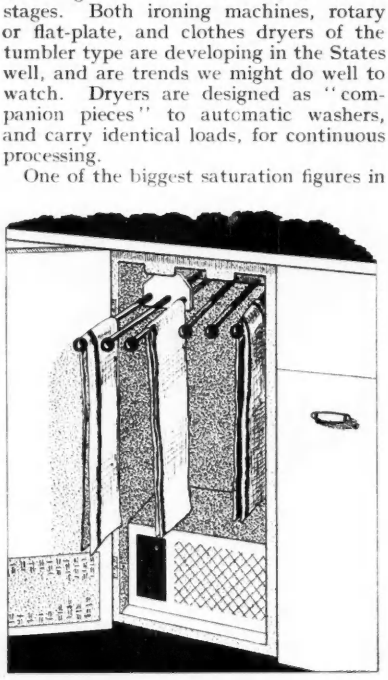
The trend now is for newer and better "automatics"—fresh designs are reaching the market on steady lines. At the 40th annual convention of the American Home Economics Association, which I attended in San Francisco, two of the latest were displayed. Both had flexible rubberized tubs, one employing a modern-design plastic agitator and the other water "activation." But the sensational process came after rinsing, when the water was extracted (1) by putting the motor into neutral, and reversing action to create a vacuum, applying a "kind" but firm squeeze-dry action with the flexible tub, rinse water being filtered away through the hollow central tube of the agitator itself; and (2) a filtered-water rinsing was followed by high-speed spinning. It certainly seems that these American appliance makers are on their toes to find new and more effective ways of promoting home laundrywork, both in freedom of controls and in saving of fabric wear.



**An American idea for small kitchens—an electrically fitted table with upholstered benches to seat four. When out of use, the seats, hinged on strong tubular steel supports, swing neatly beneath out of the way. When not in use for the service of meals, the porcelain-topped table is ideal for cookery purposes. Two outlets permit both table lamp and toaster (or coffee percolator) to operate at the same time. A San Francisco store offers this to customers at $39.95 (£10)**

Other items that I noted were the very close tie-up between detergent and soap interests and washer performance. It seems that even closer research association might be valuable here, at earlier stages. Both ironing machines, rotary or flat-plate, and clothes dryers of the tumbler type are developing in the States well, and are trends we might do well to watch. Dryers are designed as "companion pieces" to automatic washers, and carry identical loads, for continuous processing.

One of the biggest saturation figures in



**Tea towels are dried in this system by warmed air circulated through the rack-fitted recess by a blower at the bottom. Sliding rails present the freshened linen when required**

American appliance marketing is in refrigeration. About 77 per cent of wired homes (26,967,000 cabinets) are in use. Now a new companion unit has arrived—the home freezer, which promises to give women the finest thrift-maker and labour-saver they have ever known. It is a safe bet that bottling, as a means of food preservation, will disappear when freezers are marketed at approachable prices. In the meantime United States salesmen are exhorted thus: "Freezer users can now be counted in the millions . . . and the freezer business has progressed out of the infancy stage." In round figures, 675,000 freezers were sold during 1948, or by ratio, one freezer to every seven refrigerators. A total of 1,400,000 freezers are now installed in 4 per cent of American wired homes. Average prices run from $300-$400 (£75—£100).

The most significant development in refrigerator design in America is undoubtedly the "combination" type cabinet, with high-humidity storage. This two-part design combines an upper self-contained food freezing compartment (at zero) with a lower storage cabinet operating independently. Each section is illuminated when doors are opened—and food in the storage cabinet is maintained at high humidity so that it need not be covered, cold wall conduction, rather than air movement, being the key refrigeration factor. No defrosting is necessary. The general refinements in planning and the many thoughtful fittings—including sometimes a low-heated butter conditioner set into the door—or a "left-over" rack of small containers to receive "bits and pieces" in readiness for next day's menu make-up, are often refreshingly helpful.

## Tuition in Home Freezing

I use the word "significant" in relation to combination-type refrigerators, because it is with these small freezer compartments that the educational work and preparatory sales persuasion for home freezers undoubtedly will be effected. There is little doubt that this combination freezer will have success in British homes, but very thorough educational work will be necessary on the need for keeping close to the cold wall when processing—as distinct from direct frozen food storage at zero temperatures.

I talked with several home economists who are working on these lines—freezing foods and demonstrating the work in these small compartments. American housewives refer their queries very readily to home service advisers in the utility offices—often at the rate of 40 calls per adviser daily—where their British sisters may leave things more to chance. Quick-frozen foods are processed industrially at minus 18 F. and "minus" temperatures are usually attainable in specially constructed home freezers. Admittedly, zero ice cream conservators served their purpose in "war emergency" calls in the United States but skilled use

ensured that they were not used to capacity and only with effective conduction from the walls. With this reservation, I predict great sucess for the combination refrigerator and the sooner it arrives the better.

As regards the conventional refrigerator cabinet, I noted that ultra-compact compressor units permit greatly increased storage capacities—frontal appearance showing almost "to the floor" refrigeration. The front section usually offers generous vegetable or fruit compartments. Publicity runs: "2 cubic ft additional storage on comparative floor space with older models."

Among the smaller equipment—"traffic" appliances to the manufacturers—saturation figures run high for electric mixers (23.9 per cent of wired homes) 8,400,000 being in use. Detailed planning, such as "planetary" action within the bowl; improved cleaning facilities for beaters; inset lights for "spotting" the work, etc., is now well accepted. Kitchen planners, and makers of prefabricated units, find new and acceptable ways of housing the mixer, so the housewife can swing it into action with as little physical effort as possible. A wide choice of attachments is now available for mixer application.

### Automatic Toasters

The coffee maker—indispensable in the American home—is another well-developed appliance. The saturation figure approximates to 50 per cent with 17,550,000 installed. More and more of these are becoming automatic, along with toasters at 64 per cent saturation—22,712,000 supplied and in use. A new "high" in automatic action was reached this summer, when a well-known maker introduced a "radiant control" toaster (on the lines of the well-known "pop-up" variety) in which the bread is lowered automatically, thereby switching on by contact. When the bread is evenly toasted, the current is switched off and the toast is raised silently—without a "pop" or a "bang." Toasting time is automatically regulated by the type of bread instead of by timing.

As in Britain—the take-up of electric vacuum cleaners and irons is high—51 per cent (18,200,000 users) for vacuum cleaners, and 91 per cent (32,047,000 users) for irons. These figures run close to our British records—the use of vacuum cleaners in proportion to wired homes possibly running nearer 60 per cent in our own case; which goes to prove the effectiveness of the wholehearted research and selling methods followed before the war.

What I feel is needed is alert thinking and wholehearted planning by our industry and a closer study of the potential purchaser and her home conditions, to promote a more effective use of materials and produce lower-priced equipment. Well-designed and sometimes excellent appliances, here and there, we certainly have, but prices run high especially when loaded with a crippling purchase tax. What it appears we need is more effective co-ordination and a more flexible attitude of mind in the planning of appliances. This should promote, not retard, our export flow and need not mean more elaborate or more expensive merchandise.

## South African News

INFORMATION collected by experts appointed by the Inter - Territorial Hydro-Electric Power Commission indicates that the Kariba Gorge, on the Zambesi, will be a more suitable location for the proposed scheme than the Kafue Gorge. It is unlikely that the Commission will be able to submit a final report much before the end of the year. Preliminary investigations, however, show that the potential output of a Kariba Gorge scheme is about 800,000 kW, as against 250,000 kW from the Kafue.

The Government of the Union of South Africa has issued a summary of the country's imports and exports during the second half of last year. It shows the following values of the principal imports of electrical goods. Because of the gaps in the Union's statistical records no comparison with 1947 is possible. Full accounts for 1946 have, however, been published, and increases compared with half the values for that year are given in the accompanying table.

| Class | June-Dec. 1948 £(000) | Inc. on half 1946 £(000) |
|---|---|---|
| Batteries and parts ... ... | 432 | +223 |
| Dynamos and generators ... | 165 | + 52 |
| Motors ... ... ... ... | 899 | +655 |
| Transformers ... ... ... | 369 | +204 |
| Cable and wire, rubber insulated | 418 | +226 |
| Ditto, other insulation ... ... | 1,169 | +949 |
| Elec. stoves and parts ... ... | 629 | +558 |
| Lamps ... ... ... ... | 278 | + 33 |

# Transmission in Sweden

## LONG 380 kV LINE

THE fact that the major Swedish water-power sources are in the north of the country while the main consuming centres are in the south has necessitated the construction of long transmission lines. When power schemes now in hand are completed the existing 220 kV system will no longer be adequate and will have to be supplemented by 380 kV lines of considerably greater capacity.

The Swedish Hydro-Electric Board is at present engaged on building one 380 kV a.c. line which will, it is claimed, be the longest in the world. Details of the new line, given in *Swedish Foreign Commerce* show that it will be 593 miles long, from Harspranget 22 miles north of the Arctic Circle, to Hallsberg, where the supply will be stepped down to 220 kV. At Midskog, half-way between the two terminals, there will be a transformer station for linking the 380 kV line with the 220 kV network.

The conductors are suspended from steel towers (of which there will be about 3,000) each weighing 7.1 tons and similar in design to those of the 220 kV lines. All steel parts are hot galvanized, the lower sections being also dressed with zinc sheet as an added protection against corrosion. The standard span is 1,080 ft, the height of the cross beam above ground 75 ft and the clearance between phases 39 ft. Double conductors are being used, consisting of two 0.918 sq in steel-aluminium cables per phase suspended side by side with a clearance of 17.75 in. The advantage of the double conductor over a single one of larger diameter is that the line reactance is reduced, in the case of 17.75 in clearance, by 26 per cent. This considerably improves the line stability and also serves to raise the critical corona voltage.

The first generator at the Harspranget waterfall is scheduled to come into operation at the beginning of 1951 by which time the new transmission line should be completed. It will first be operated at 220 kV, the voltage being raised to 380 kV at about the end of 1951 or beginning of 1952 when two further generators are expected to be ready at Harspranget. The cost of the entire system will be about 230 million Sw. cr. (£16,400,000).

The scheme will be followed by another line to the south which should be ready by 1953 and successive extensions of the transmission system are then visualized until it is able to carry all the hydro-electric power available. At present the number of 380 kV lines required for the purpose is estimated at six.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## Unified Screw Threads

IN December last the signing of the declaration between Great Britain, the United States and Canada relative to the unification of screw threads was announced. Since then the completion of details has permitted the publication of national standards in Great Britain and America, while the Canadian standard is to be expected shortly. All the technical information needed to ensure the interchangeability of threaded products made in all three countries to conform with this basic thread form is included, with numerical data and complete tables of dimensions, in B.S. 1580. Comments on this specification will be welcomed, before 31st December, by the British Standards Institution, 24, Victoria Street, London, S.W.1, from which copies are obtainable for 7s 6d each.

## E.I.B.A. (Sussex) Ball

THE annual ball organized by the Sussex Centre of the Electrical Industries Benevolent Association will be held on 27th October at the Royal Pavilion, Brighton Tickets (21s each, including buffet) may be obtained from Mr. E. G. Heath, hon. secretary and treasurer of the Centre, c/o Electric House, Castle Square, Brighton.

# Electricity in Metallurgy

## *Some Tendencies and Developments*

By L. SANDERSON

ONE of the most interesting trends in the production of pig iron is towards the employment of the electric blast furnace. This is possible economically, at present, only in localities where ample water power is available, with abundant additional sources of power for future exploitation. Spain is considering the adoption of the electric blast furnace. A type known as the Tysland-Hole has been designed for pig-iron production.

Advantages of the direct-reduction process in the electric furnace include smaller capital outlay, greater flexibility, closer control and temperatures up to 2,000 deg C in the arc zone, thus providing conditions suitable for intense desulphurization, unobtainable in the old type of blast furnace, and permitting the use of pyrites at present discarded.

### Induction-heated Cupola

A combined coke- and induction-heated cupola for making iron of high quality has been designed. The largest so far made is capable of melting 4 tons an hour. The lower part of the cupola, well below the tuyere level, is heated by induction, the object being to superheat the metal from 100 to 200 deg C, with a consumption of energy of only 60 to 120 kWh/ton.

Iron powder has been produced on a pilot plant scale by the electrolysis of 10 per cent ferrous ammonium sulphate solution at 35 deg C (pH of 2.5) with 200A/sq ft, half the current being fed through iron anodes and half through lead anodes in porous pots. The resulting furry deposit is scraped off the cathode at intervals of two hours and the collected sludge is washed first with sulphuric acid and then with citric acid. The surrounding liquid is made ammoniacal. The powder is washed, drained, then rapidly dried under reduced pressure, or in hydrogen. In this way a dendritic powder with an oxygen content of about 1 per cent is obtained, but the hardness of the particles causes poor compacting properties. Annealing of the powder in hydrogen at not less than 600 deg C, preferably at 700 deg C, for one hour greatly improves the compact. Two other methods of electrolytically producing iron powder have been the subject of preliminary experiments.

A number of different ferro-magnetic materials are now available to the electrical industry for making magnetic powder cores, and the effective range extends from low power frequencies to thousands of megacycles.

### Quality of Electro-Tinplate

From studies of the properties of electro-tinplate deposited from stannous-sulphate/creosulphonic-acid baths, it has been established that the quality of the coating improves as the concentration of tin in the bath is raised from 15 to 40 g/litre. There is an optimum concentration of creosulphonic acid, depending on the tin content. Raising the bath temperature as well as increasing the current density impair the quality of the coating. The addition of commercial wetting agents does not cause any significant improvement.

High-frequency melting and heat-treatment furnaces employed by the Swedish metallurgical industries have certain characteristic features. They include the use of series capacitors, automatic control, ceramic insulation of the coils, double-frequency coils and the arrangement round the coils of packets of laminated transformer iron.

An experimental investigation into the cutting of hard metals by electro-erosion (destruction of a metallic surface by means of an electric spark discharge) has been concluded at a large automobile works in the U.S.S.R. Comparison of the results with sawing show that electro-cutting may be used for hard metal when sawing is quite impracticable.

The novel oxy-arc cutting process consists of striking an arc between the part

to be cut and a hollow steel electrode. When the metal is heated sufficiently, oxygen is directed on to it through the electrode.

The fuse-bond process for preparing metal surfaces for metallizing is attracting attention. Alloy welding electrodes, at a high current density and low voltage, are stroked lightly over the surface to be prepared. The high contact resistance causes the electrode tip to melt and small particles to vaporize, forming a discontinuous arc and a sputter of metallic foam, which adheres to the base metal but has a very rough upper surface.

# British Association

## PAPERS AT THE NEWCASTLE MEETING

THE annual meeting of the British Association for the Advancement of Science is now proceeding (31st August to 7th September) at Newcastle-upon-Tyne, this being the 112th of the series. It commenced with an evening congregation of the University of Durham, followed by the inaugural general meeting, at which the presidential address was delivered by Sir John Russell in the City Hall on world population and world food supplies. The numerous Sectional meetings began, as usual, on the following morning.

### Soil Heat Conductivity

In Section A (Mathematics and Physics) a contribution from Dr. Ezer Griffiths described methods of determining the thermal diffusivity and heat conductivity of soils, the former by causing the surface of an electrically heated sphere to follow a sinusoidal temperature curve, and the latter by heating the surface to a steady state. Some of the data so obtained are significant in the rating of buried cables and with reference to the transfer of heat between the ground and buildings.

The present state of the theory of elementary particles (mesons) and some recent experiments at Bristol University were outlined by Drs. N. Kemmer and F. C. Frank, respectively, while Mr. J. S. Hey dealt with radio-frequency observations of the sun, Mr. F. G. Smith with stellar astronomy at radio wavelengths, and Dr. A. C. B. Lovell with radio echo observations of meteors.

In Section D (Zoology) recent research into the use of echo-sounding for finding fish was described by Dr. W. C. Hodgson, who illustrated with lantern slides the way in which certain species can be identified by the echoes they cause.

In Section G (Engineering), the president of which is Sir Arthur P. M. Fleming (Metropolitan-Vickers) the general position with regard to new materials and their engineering significance were the subject of the first morning's discussion.

### Electronic Semi-conductors

Dr. R. W. Sillars (Metropolitan-Vickers) spoke of the group of conducting materials which were of use to the engineer, particularly the light-current engineer, because they enabled him to perform "circuit conjuring tricks" which were impracticable without them. These materials, which fell into the class of electronic semi-conductors, displayed a fascinating variety of electrical properties. They consisted of substances which were relatively poor conductors but which, like metals, transported electricity by flow of electrons and not, like electrolytes, by flow of ions.

A great many of them were compounds of metals, such as the oxides of copper, lead, nickel and titanium, but there were also the elements boron, silicon, germanium, selenium and tellurium. The major characteristics which they had in common were that their resistivity was acutely dependent on small changes of composition or of impurity content; that it fell with rising temperature and, furthermore, at electrical contacts with another material, or another piece of the same material, a voltage was built up which was not proportional to the current and might depend on its direction. These, however, were generalizations, as not all semi-conductors displayed all these properties in all circumstances.

They differed fundamentally from metallic conductors in that the electrons which carried the current were a few

which had temporarily escaped from rather weak attachments to fixed ions, where they would be held if the temperature was very low. Whereas the conducting electrons of a metal had no ties and could move freely at all temperatures, the conduction electrons in a semi-conductor were released by the thermal energy corresponding to the temperature and, after wandering about for a while, would return to a fixed position until released again. The higher the temperature the more electrons were free at any instant, and the higher the conductivity. A semi-conductor was fundamentally an insulator which was too hot to insulate, even at room temperature.

### Effects of "Impurities"

The fixed ions from which the electrons were released were generally adventitious ones which did not properly belong to the lattice structure. This type of material was called an "impurity semi-conductor," the so-called impurities being excesses of metal or oxygen. This excess, and therefore the conductivity, depended critically on the atmosphere and temperature of preparation.

More recently solid solutions of magnetic iron oxide ($Fe_3O_4$) in various salts, magnesium chromate, zinc chromate and zinc titanate, had been put forward, but did not entirely fit into the picture of impurity semi-conductors. It was extremely probable that other materials would appear in due course.

The most direct use of these effects was for the measurement of temperature or radiation, especially when high sensitivity rather than precision of absolute value was required; when delicate instruments and elaborate amplifying equipment had to be avoided and for compensating the opposite change of resistance of copper in electrical instruments and voltage regulators, which could be done more efficiently by a small resistance of this kind than by a swamp resistance of zero temperature coefficient.

The materials so far mentioned did not show any noticeable rectifying properties. Nevertheless they would rectify under suitable conditions. In many semi-conductors, the electrons behaved as if they had a positive and not a negative charge, which was important in rectifiers because the direction of rectification depended on the type of conduction. The author dealt with semi-conductors at some length because developments in this field were giving circuit engineers a number of new degrees of freedom and had been more varied than in the field of new dielectrics.

A major advance in machine design required insulators which would withstand higher temperatures than the usual combinations. Glass fabrics in combination with the more heat-stable organic varnishes had disadvantages, primarily due to the relative coarseness and brittleness of glass fibre. Recently asbestos paper impregnated with a heat-resisting varnish had found some uses where ability to withstand high temperature was more important than a high breakdown strength and low moisture absorption.

The new fabric made from esters of terephthalic acid, known as "Terylene," promised to be useful, for it would withstand 180 deg C, had a very low moisture absorption, and could be woven into fine fabrics of good mechanical strength.

So far the tendency had been to use silicone varnishes in small quantities at difficult hot spots rather than to design new machines for much higher temperatures with insulation entirely of silicones.

After mentioning developments in resins and ceramics, the author said it was reasonably to be hoped that the next decade or so would see in regular use plastic materials at both radio and power frequencies which would withstand considerably higher temperatures than those now common.

### Magnetic Materials

Dr. F. Brailsford (Metropolitan-Vickers) reviewed progress and possibilities in the improvement of magnetic materials, particularly iron and silicon-iron alloys.

The reduction of iron losses was urgently needed. Designers were faced with the practical difficulty of dissipating waste heat without exceeding permissible temperature limits. For example, in a 50,000 kW turbo-alternator about 250 kW of iron loss would be produced, and in a large transformer core built from the best available British silicon steel there would be about 1 kW of iron loss to every 2 or $2\frac{1}{2}$ cu ft of core.

America had left this country far be-

hind in the production of high quality electrical sheets, especially for transformers. From the point of view of overseas competition this situation should be quickly corrected.

It was now American practice for some of the better grades of hot-rolled material to undergo a decarburizing treatment of the sheet in its finished thickness, and to obtain a larger grain size by a special rolling technique. Material so treated was 40 per cent lower in loss and much superior in mechanical properties and in saturation value. Probably more than half of the total output of American transformer cores of all sizes was being made of directional cold-rolled silicon steel having an iron loss which was only about one half of that of the best steel available in quantity in this country.

Because of its cheapness and high magnetic saturation value, iron must continue to be the basic element employed. The scope for improvement of soft magnetic materials by alloying iron was severely restricted. By alloying iron and nickel, very low hysteresis and very high permeability in low field strengths were obtainable. Unfortunately these alloys were expensive and low in saturation value.

Research in Holland had shown that non-metallic magnetic materials of high permeability and very high electrical resistivity might be prepared by combining, in suitable proportions, certain oxides known as ferrites. Initial permeabilities as high as 4,000 and saturation values of about 5,000 gauss had been obtained. The fact that such remarkable magnetic materials could be devised was a clear reminder that all avenues of approach to the problem of improving magnetic materials had not yet been fully explored.

# German Electrical Exports

ELECTRICAL exports from Germany last year totalled Rm.28,550,000 in value and imports Rm.5,404,000. The only substantial item among the latter was metal-filament lamps to a total value of Rm.2,603,000, with Belgium supplying one-half. Some power plant of moderate capacity was also imported. The principal groups of exports, with leading countries of destination, are shown in the table below. Although Europe was the chief customer for these goods there were small shipments to countries farther afield including the far East.

| Class | 1948 Rm.(000) |
|---|---|
| *Dynamos, motors, converters and transformers up to 10 kg.* | 1,213 |
| To Belgium ... ... | 165 |
| ,, Holland ... ... | 165 |
| ,, Norway ... ... | 336 |
| ,, Sweden ... ... | 378 |
| *Ditto, 10 to 25 kg.* ... | 421 |
| To Holland ... ... | 192 |
| ,, Sweden ... ... | 150 |
| *Ditto, over 25 kg.* ... | 817 |
| To Holland ... ... | 64 |
| ,, Switzerland ... | 27 |
| ,, Austria ... ... | 71 |
| *Complete armatures and commutators* ... | 1,512 |
| To Austria ... ... | 1,099 |
| ,, Saar ... ... | 163 |
| *Cable, underground or submarine* ... ... | 660 |
| To Denmark... ... | 91 |
| ,, Saar ... ... | 67 |
| ,, Austria ... ... | 170 |
| ,, Sweden ... ... | 259 |
| *Telegraph material* ... | 288 |
| To Belgium ... ... | 54 |
| ,, United Kingdom | 96 |
| ,, Norway ... ... | 69 |

| Class | 1948 Rm.(000) |
|---|---|
| *Telephone material* ... | 427 |
| To Belgium ... ... | 88 |
| ,, Luxemburg ... | 56 |
| ,, Holland ... ... | 94 |
| ,, Norway ... ... | 79 |
| *Radio apparatus* ... | 1,075 |
| To Belgium ... ... | 223 |
| ,, Holland ... ... | 152 |
| ,, Switzerland ... | 327 |
| *Measuring, etc., instruments* ... ... | 2,370 |
| To Belgium ... ... | 245 |
| ,, Finland ... ... | 484 |
| ,, Holland ... ... | 417 |
| ,, Sweden ... ... | 663 |
| *Heating, cooking, etc., apparatus* ... ... | 683 |
| To Belgium ... ... | 221 |
| ,, Greece ... ... | 158 |
| ,, Switzerland ... | 60 |
| ,, Peru ... ... | 58 |
| *Lighting, power transmission, switch, etc., equipment* ... ... | 6,461 |
| To Belgium ... ... | 900 |
| ,, Luxemburg ... | 308 |
| ,, Finland ... ... | 342 |
| ,, Holland ... ... | 3,394 |
| ,, Switzerland ... | 1,124 |

| Class | 1948 Rm.(000) |
|---|---|
| *Lighting and starting equipment for i.c. engines* ... ... | 363 |
| To Switzerland ... | 114 |
| ,, Holland ... ... | 66 |
| ,, Sweden ... ... | 96 |
| *Ignition, etc., equipment for heavy vehicles* ... | 3,476 |
| To Belgium ... ... | 287 |
| ,, Holland ... ... | 1,447 |
| ,, Switzerland ... | 1,251 |
| *X-ray apparatus* ... | 939 |
| To Holland ... ... | 332 |
| ,, Sweden ... ... | 129 |
| ,, Switzerland ... | 209 |
| *Electro-medical apparatus* ... ... ... | 2,618 |
| To Holland ... ... | 601 |
| ,, Sweden ... ... | 662 |
| ,, Switzerland ... | 284 |
| ,, Uruguay ... | 258 |
| *Metal filament lamps* ... | 2,603 |
| To Belgium ... ... | 1,356 |
| ,, Holland ... ... | 249 |
| ,, Austria ... ... | 151 |
| ,, Sweden ... ... | 460 |
| ,, United States ... | 267 |

# Commerce and Industry

## Price Control Removed
## Richard Crittall Plans

THE Board of Trade has decided to free from price control a number of goods which include such domestic heaters, refrigerators, cooking, washing and cleaning appliances and lamps (except oil lamps) as are still subject to control, and electric clocks. The necessary Orders will be made shortly, and will come into operation on 26th September. It will be recalled that Orders were made in July last freeing from price control radio and television sets and radio-gramophones and their components, and accessories, and "fittings and accessories for electric and gas lighting, domestic and office appliances and apparatus operated by electricity and gas, fans, portable lamps and hand torches, and their components and accessories."

### Richard Crittall & Co. "Re-launched"

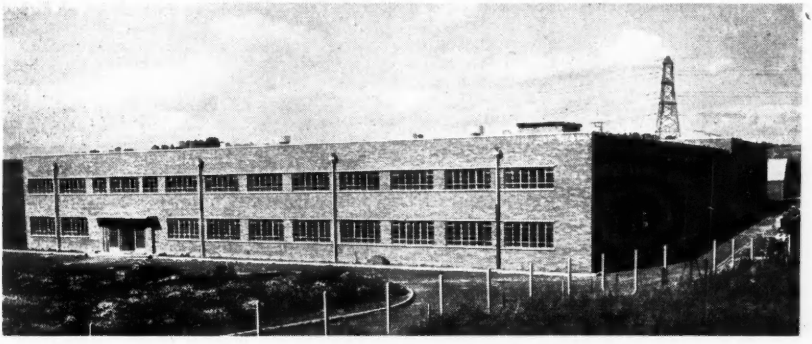
Plans for the re-launching of Richard Crittall & Co., Ltd., after the collapse which occurred about eighteen months ago were put before a Press conference last week by Mr. Geoffrey C. R. Eley, chairman, who was supported by Sir George Cuffe, managing director, and technical directors of the company. Mr. Eley said that the company's misfortunes had been due to ambitious ventures into too many fields. Now it was intended to adhere strictly to the heating and ventilating business by which the company had gained its reputation. Novel inventions in this field had been taken up and they were reasonably optimistic about the future. Only two subsidiaries had been retained—Grierson, Ltd., and Richard Crittall Marine, Ltd. There remained no links with other former subsidiaries.

### Electrical Employment

The number of persons employed in the electrical manufacturing, contracting and electricity supply industries in Great Britain in June totalled 717,800, according to the *Ministry of Labour Gazette*. This compares with 719,500 in the previous month and 721,900 in mid-1948. At 11th July last there were 4,303 persons registered as unemployed in the electrical manufacturing industry, 1,325 in electrical wiring and contracting and 640 in the electricity supply industry.

### New Santon Factory

Construction has now been practically completed of a new water heater and switchgear factory for Santon, Ltd., in Corporation Road, Newport, Mon., and the company hopes to move in early in the New Year. Nearly three times the size of the old Somerton Works, which the company has now occupied for eighteen years, the new building has a floor area of 85,000 sq ft, 52,000 sq ft of which is used for workshops, 13,000 sq ft for offices, 15,000 sq ft for canteen, first-aid rooms, cloakrooms, etc., and 5,000 sq ft for outbuildings. The



New Santon factory at Newport

site on which the building has been erected is about half a mile from the old works and extends over 23 acres, 13 acres being used as playing fields.

Air conditioning is being provided throughout the works and a totally-enclosed spray shop has been arranged with an air pressure slightly above that of the rest of the factory in order to keep out dust. The arrangements for the storage of raw materials, components and sub-assemblies are probably the most up-to-date in the country, 35,000 cu ft of steel bins and racks being provided. Assuming that conditions for the manufacture of water heaters and other electrical equipment improve, the factory will provide work for about 1,000, roughly twice as many as are now employed.

## Lighting for Radio Set Assembly

Artificial illumination for the assembly of radio sets has to satisfy two main requirements; sufficient light must be available for the intricate work and the quality of the lighting must enable easy colour discrimination because of the wiring colour code used. To meet these requirements "Metrovick" fluorescent lighting has been installed in the new Plymouth factory of Bush Radio Ltd. The fittings are mounted 4ft 6in above the working plane at 6ft centres and provide an illumination of 30 lumens per sq ft. The installation was carried out by W. G. Heath & Co., Plymouth, under the supervision of the architects Fuller, Hall & Foulsham, London.

**Fluorescent lighting in the factory of Bush Radio, Ltd.**

## Northampton Polytechnic

Two courses of lectures, one dealing with recent trends in fuel technology and the other ceramics, their production, testing and utilization, commence at the Northampton Polytechnic, St. John Street, London, E.C.1, in October next. Particulars can be obtained from Mr. J. E. Garside, Head of the Department of Applied Chemistry.

## Photographic Exhibition

This year's annual exhibition of the Royal Photographic Society at its premises at 16, Prince's Gate, London, S.W.7, is in two parts. The general section will run from 9th September to 2nd October inclusive and the other part—scientific, nature, record and technical—from 8th to 26th October.

## Cold Pressure Welding

The General Electric Co., Ltd., has decided that since its cold pressure welding process can be put to a wide range of uses, both inside and outside the electrical field, industry as a whole should have access to the process, so that the technique can be exploited and developed in the widest possible way. Arrangements have accordingly been made for the issue of non-exclusive user licences to all firms who wish to use the process (except for certain electrical uses) at a low royalty rate to be settled separately for each firm. The G.E.C. will not undertake any specialized development work on projects put forward from outside the company, but advice and demonstrations will be given at its research laboratories to enable potential users to gauge whether the process is suitable for their particular needs. An arrangement has also been made with a London firm whereby specialized tools and machines can be manufactured and supplied to users of the process. A copy of the G.E.C. brochure on cold welding will be forwarded on application to Magnet House, Kingsway, London (quoting reference PUBL/JHJ).

## Austin-Crompton Parkinson

The Austin Motor Co., Ltd., and Crompton Parkinson, Ltd., announce that through their joint subsidiary company, Austin Crompton Parkinson Electric Vehicles, Ltd., they have acquired control of I.T.D., Ltd. of "Stacatruc House," 142, Sloan Street, London, S.W.1. Mr. L. P. Lord, chairman and managing director of the Austin Motor

Co., has been elected chairman. Col. Raymond T. Hartmann will continue as managing director of I.T.D., Ltd., which company are the sole world distributors of a petrol-driven range of British industrial fork lift trucks and ancillary material-handling equipment marketed under the trade names "Stacatruc" and "Aerolift."

It is the intention of the group immediately to develop and expand the existing range of equipment, both for the home and overseas markets, and to include the manufacture of electric battery operated "Stacatrucs."

## Contract Price Adjustment Formulæ

The following are the latest figures for use in the B.E.A.M.A. contract price adjustment formulæ: The rate of pay for adult male labour at 13th August is deemed to be 115s (unchanged). Cost of materials: the Board of Trade index figure for intermediate products at 13th August is 256.9, and is the figure for the month of July (against 257.9 for June).

## Sussex Industries Exhibition

Electrical exhibitors at the Sussex Exhibition, which is being held at the Corn Exchange, Brighton, from 14th to 24th September next, will include Page & Miles, Ltd., C.M.C. (Switchmatic), Ltd., and the Solway Electric Co.

## Royal Lancashire Show

One of the attractions at the recent Royal Lancashire Agricultural Show held at Blackpool was the display organized by the North Western Electricity Board, in co-operation with the British Electrical Development Association and the Merseyside & North Wales Electricity Board. The stand was visited by over 30,000 of the 80,000 visitors who attended the Show.

The facia of the stand had two display windows, each featuring an animated model, one dealing with milking and the other washing. In the foyer, cartoons and photographs compared old and new farming practices. About 100 modern examples of electrical equipment for the farmer, his wife and the commercial caterer were displayed in the marquee and several of the stands dealing with particular farm units, were realistically roofed to simulate the buildings concerned. A touch of comedy was added to the display by the inclusion of a 40-ft "Heath-Robinson" animated display, which was discovered in a Morecambe attic where it had been placed many years ago.

## Industrial Supervisors' Courses

Week-end residential courses for foremen and supervisors are being arranged at Primrose Hill, Birmingham, by the Institute of Industrial Supervisors (Bank Chambers, 47, Temple Row, Birmingham, 2). The first is to be held from 16th to 18th September.

The programme includes lectures on several aspects of the supervisor's work and its relation to other industrial functions and there will be a visit to a large manufacturing plant. The inclusive fee is £2 10s. Applications should be sent to the secretary.

## Burmese Import Licences

The Burmese authorities have announced under date 15th July that import licences (with exchange control copies), with a few exceptions, dated 1st March, 1949, and subsequently and valid up to 20th June, 1949, in respect of which revalidation fees are paid on or before 15th August, 1949, will be automatically extended as from date of payment up to 31st December, 1949. The Counsellor (Commercial), British Embassy, Rangoon, emphasizes that revalidation is entirely dependent on prior payment of revalidation fees by the importer.

## Bookstall Lighting

Lighting combining effect, quality and futuristic application is well illustrated in W. H. Smith & Son's latest bookstall, now open at the British Railways' headquarters, Marylebone Station. The lighting, designed to the specification of the Estate Department of W. H. Smith & Son, was supplied by Siemens Electric Lamps and Supplies, Ltd., whose equipment is used throughout.

**Lighting of W. H. Smith & Son's bookstall at Marylebone station**

"Sieray" fluorescent "Natural" lamps are used in all cases, operating from remote control gear, to give the required colour effect. The types of lamps used vary from 2ft 40 W up to 5ft 80 W.

## Electric Vehicles for New Zealand

The accompanying picture shows one of six N.C.B. (Northern Coach Builders) electric vehicles supplied to the dairy trade in

**A N.C.B. electric vehicle ready for despatch to New Zealand**

New Zealand through United Holdings, Ltd., of Christchurch, New Zealand. Three of these vehicles are operated by Stonex Bros., Ltd., of Auckland, and the other three by Riversdale Dairy Supplies, Greymouth, New Zealand.

## Packaging Code for Industry

The first Code of Packaging prepared by the British Standards Institution, issued during the war, was mainly to guide Service and Government Departments and their packaging contractors. The export drive has supplanted the Forces as the "target" for the Code and the Packing Code (B.S. 1133) has now been completely revised and extended under the supervision of the B.S.I. Packaging Standards Committee.

Considerable structural and textual changes have been made to the Code to suit present-day needs, particular emphasis being given to the packaging of the products of industry for home and overseas distribution. Several sections of the first edition have been subdivided and merged with others, and new sections have been added. The work is too large to issue as one complete entity, and it is therefore being published as seventeen sections, as and when ready.

The first three sections are grouped together as an "Introduction to Packaging" (price 4s net, post free), in which the principles governing design, construction, and materials are outlined. Five other sections are also available in completed or provisional form, viz.: Wooden Containers (6s net); Textile Bags, Sacks and Wrappings (3s net); Packaging Felt (2s net); Adhesive Closing and Sealing Tapes (2s net); Tensional Steel Strapping (2s net). Copies of the Introductory and other Sections, as published, can be obtained from the British Standards Institution Sales Department, 24-28, Victoria Street, London, S.W.1.

## South African Economies

The Johannesburg correspondent of *The Times* reports that the Union Treasury has warned the Pretoria and Johannesburg City Councils that capital expenditure must be reduced wherever possible and that only the most urgent work should continue. According to the Pretoria representative of the *Star* (Johannesburg) projected works not approved by the Treasury are the second stage of the new power station costing about £1,600,000 and general electrical extensions costing about £1,500,000.

## Cooker Display Devices

Parnall (Yate), Ltd., is to circulate amongst electricity undertakings and other distributors of Parnall electric cookers two "Stereoptic" displays which show pictures of the cookers in natural settings in full colour. The displays consist of stereoscopic colour photographs, produced by a multi-angle process, which give a three-dimensional effect. The pictures are mounted in cabinets which will stand on floor or counter, and, connected to the mains, are brightly illuminated.

## Safety Conference

The safe use of electrical apparatus in hazardous atmospheres is one of the subjects to be discussed at a residential conference to be held at Scarborough (7th to 9th October, Royal Hotel) which is being organized on behalf of the Association of British Chemical Manufacturers by the Royal Society for the Prevention of Accidents. Speakers will include A. J. Amor, president of the Association of Industrial Medical Officers; Mr. T. Senior (I.C.I.); and Mr. S. W. Richards (G.E.C.). The conference fee, including accommodation, is £5, and further particulars are obtainable from the R.S.P.A., Industrial Safety Division, 131, Sloane Street, London, S.W.1.

## Sound Recording Specification

Magnetic tape for recording sound is the subject of B.S.1568, which is based on B.B.C. proposals and intended to facilitate the interchange of recordings. It specifies the width and thickness of tape, width of guides, speed of tape, sense of winding, diameter of reel, spool centre and manner of fixing to machine, playing time, frequency

response and marking for identification of recorded programme. Copies are obtainable for 2s from the British Standards Institution, 24, Victoria Street, London, S.W.1.

## Trade Announcements

**Simpson, Baker & Co., Ltd.,** announce that their representation in the Midlands area is being increased. Mr. J. R. Denley will now confine his activities to the counties of Staffordshire and Shropshire, and Mr. C. R. Ellwood, who has recently joined the staff, will represent them in Leicestershire, Worcestershire and Warwickshire (excluding Birmingham).

**White, Jacoby & Co., Ltd.,** have removed to 16, Surrey Lane, Battersea, London, S.W.11 (telephone: Battersea 3377).

The address of the Scottish office of **Linolite, Ltd.,** is now 27, Douglas Street, Glasgow, C.2. The company's agent in Scotland is Mr. W. Fraser.

**Plant & Contractors Machinery (London), Ltd.,** has removed to Helena Chambers, 42, The Broadway, Ealing, W.5. The telephone number is unchanged.

Mr. C. Bentham has retired from the board of Henry Simon (Holdings), Ltd., but is continuing active engineering and industrial work on his own account. A new company named **Cecil Bentham, Ltd.,** has been formed with registered office at Ashbourne House, 334, Wellington Road North, Stockport. The directors are Messrs. C. Bentham, M. Bentham and R. A. Barker and Rosie Barker.

**L. Wilkinson,** wholesale distributors of radio and electrical supplies, etc., have removed to 19, Lansdowne Road, Croydon (telephone: **Croydon 0839**).

## Hot-water Tanks

To the standard specifications for domestic hot water storage vessels, B.S.417 and 699, two more have been added. They provide for a range of seven sizes of indirect cylinders in two classes for maximum permissible working heads of 60 and 30ft respectively. B.S.1565 deals with annular and saddle-back galvanized mild steel types and B.S.1566 with the annular copper type. The requirements include provision for screwed connections for auxiliary electric heating in a variety of ways so that users may choose the most suitable for their operating conditions. Copies are obtainable for 2s 6d, from the British Standards Institution, 24, Victoria Street, S.W.1.

## Argentine Fluorescent Lamp Market

According to the *Foreign Commerce Weekly* (Washington), a substantial market exists in Argentina for fluorescent lamps, for which imports and domestic assembly satisfy only a small part of the demand. It is believed, however, that domestic production will be encouraged. At present these lamps are produced in Argentina from imported components by one firm. Assembly was started in the latter part of 1948; the estimated daily output is 3,000 lamps. Two more firms are expected to begin operations during 1950.

## Immersion-heater Boiler

The loading of the "Handy-Boiler," made by F. J. Tomlinson, Ltd., Hall Carr Mill, Rawtenstall, was wrongly given in our issue of 19th August (page 354). The correct figure is 1½ kW.

## Catalogues and Lists

**Hotpoint Electric Appliance Co., Ltd.,** Crown House, Aldwych, London, W.C.2.—Four priced leaflets describing a domestic clothes dryer, two irons and a kettle.

**British Thomson-Houston Co., Ltd.,** Crown House, Aldwych, London, W.C.2.—Illustrated catalogue of lighting fittings and associated accessories for marine use.

**Barries Electrical Agencies, Ltd.,** King Street, Brighton, 1.—Priced folder on push-button and limit switches.

**Metway Electrical Industries, Ltd.,** King Street, Brighton, 1.—Priced catalogue of sliding dimmer resistances, industrial and commercial heating elements.

**Communication Systems, Ltd.,** Strowger House, 8, Arundel Street, London, W.C.2.—Brochure describing school broadcasting equipment.

**Hackbridge & Hewittic Electric Co., Ltd.,** Hersham, Walton-on-Thames, Surrey.—Two technical folders, Nos. R223 and R224, dealing with mercury-arc rectifiers for use in gasworks and dockyards.

**Corfield-Sigg, Ltd.,** Trafalgar Works, Merton Abbey, London, S.W.19.—Priced folder (in English and French) describing "Crown Merton" aluminium cooking utensils.

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## Information Department

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"MAGNEMATIC" thermal control devices.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

# RECENT INTRODUCTIONS

*Notes On New Electrical and Allied Products*

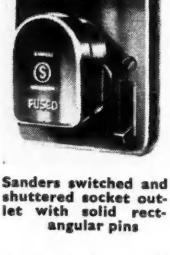
## Valve Voltmeter

A GENERAL purpose valve voltmeter designed for both bench use and rack mounting is now available from AIRMEC LABORATORIES, LTD., Cressex, High Wycombe, Bucks. It is suitable for the measurment of d.c. voltages up to 500 V and a.c. up to 150 V at frequencies between 3 Mc/s and 200 Mc/s. Its usefulness is increased by

**Airmex general purpose valve voltmeter**

the incorporation of resistance ranges measuring from 10 Ω to 100 MΩ. The circuit is arranged so that both positive and negative d.c. voltages may be measured with a high impedance while retaining the instrument at earth potential, and because neither side of the low capacitance diode in the probe unit is earthed, balanced and differential voltages may be measured on the a.c. ranges.

Resistance is measured at low voltage and the scale reads zero ohms for zero current, increased resistance being indicated by increated deflection. Another feature worthy of mention is the high stability of the zero, which only needs one setting for all ranges. The instrument is housed in a steel case, enamelled grey with a black anodized front panel on which are mounted the controls and meter.




**Sanders switched and shuttered socket outlet with solid rectangular pins**

## Switched Socket Outlet

A modified version of the shuttered socket outlet for use with plugs having solid rectangular pins, one of which is fused, has just been placed on the market by WM. SANDERS & CO. (WEDNESBURY), LTD., Falcon Electrical Works, Wednesbury, Staffs. This accessory, which is similar in appearance to the socket made in accordance with B.S.1363, incorporates a switch and is available for flush or mounting. A surface fixing model of the B.S.1363 socket outlet is also available.

## Electric Hoists

Three electrically driven hoists for maximum loads of 5 cwt, 10 cwt and one ton respectively, are offered by the PALLADIUM ENGINEERING CO., LTD., Chittening Trading Estate, Avonmouth, Bristol, under the proprietary name "Planet." They are of the single hook suspension type and can be supplied for single- or three-phase mains. Drum-type controllers are incorporated in the blocks which may be operated by means of pendant chains, and

**"Planet" electrically driven hoist**

in order to avoid the use of limit switches the motor drive pulley is fitted with a clutch which serves as protection against overloads. Mechanical brakes are also provided so that the load can be held and sustained at any point.

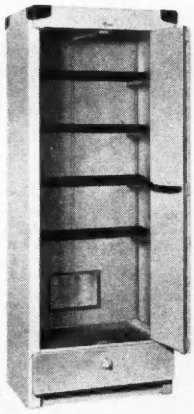
## Refrigerator Lining

To provide an odourless, stable and cold-resisting material for lining refrigerators and ice-cream conservators, and for use wherever food is stored or served, THOMAS DE LA RUE & CO., LTD. (PLASTICS DIVISION), 84, Regent Street, London, W.1, are manufacturing a special grade of "Delaron" laminated plastic. This material is avail-

able either black or white, in sheets of up to 9ft by 4ft with any required thickness.

## Clothes Drying Cabinet

A clothes drying cabinet has been specially designed by ROWE BROS. & CO., LTD., Pall Mall, Liverpool, 3, to give an easy drying heat without danger of scorching. It is constructed entirely of aluminium, the exterior being robustly finished in cream stoved enamel. The cabinet is very compact, being 70in high, 28in wide and 18in deep, plus a projection



**Rowe clothes drying cabinet**

at the top of 2½in. The door, of a novel folding pattern to prevent overbalancing, has concealed hinges and an automatic locking device.

Eight detachable tubular drying rods are fitted, together with a fixed hanger for long articles. Shielded openings at the top provide ventilation, and a wire mesh is fitted at the base to protect clothes from contact with the heating unit. The "black-heat" type elements are loaded at 2 kW and are controlled by a "Simmerstat" for a.c. operation only. For d.c. use a model is available with a foot-press switch giving three heats. A pilot light in the base operates independently of the heating elements. The price is £28, plus £7 5s 7d purchase tax.

## Fluorescent Fittings for Shop Windows

A new range of twin-lamp fluorescent fittings for shop windows introduced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, is designed to provide high concentration of light on the display in windows of medium depth. The fittings are made for 5ft, 4ft and 2ft lamps, and all are of identical cross-section so that different sizes may be butted end to end to form the required overall length. They can be supplied with hinged louvre frames which give easy access to the lamps.

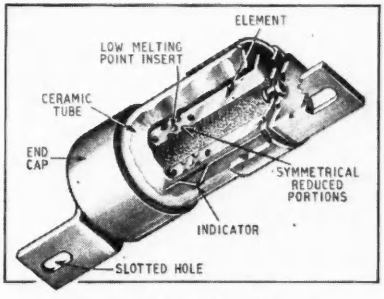
All fittings are complete with gear and internal connections, so that the only wiring needed on installation is connection of the mains to the terminal block. Knock-out holes at each end and in the centre of the top plate provide alternative wiring entry positions. Starter switch circuits are supplied as standard, but the 5ft fitting can be equipped with instant start gear. The bodies and louvre frames are of rust-proofed sheet steel, finished in white stove enamel. The reflectors are made of aluminium, electro-brightened and anodized. They can be detached from the fittings for cleaning and to give access to the gear.

## Large Pressure Cooker

To meet the demand for a pressure cooker large enough for cafés, restaurants, hotels, boarding houses, etc., L. G. HAWKINS & CO., LTD., 30-35, Drury Lane, London, W.C.2, are introducing a 16-pint "Hawkins-Universal" model with a 0.3in ground base suitable for use on electric hotplates. The new unit is simple to operate and like the other models in the range has a "Safe-T-Seal" lid which it is impossible to open under any pressure. The price is 5gns.

## H.R.C. Cartridge Fuses

The "Class Q" high rupturing capacity cartridge fuse links introduced by DORMAN & SMITH, LTD., Ordsal Electrical Works, Manchester, 5, have passed the tests of the Association of Short-Circuit Testing Authorities in accordance with B.S.S. 88, 1947, Clause 8, and certificates have been given for all three capacities, viz., 30, 60 and 100A. The fuse link can thus be guaranteed to clear a fault ranging in magnitude from its minimum fusing current to 33,000A at 440V a.c. In actual performance the fuse link remains cool when carrying its full load




**Dorman & Smith "Class Q" fuse link**

and, because of the special construction of the element, is consistent in operation.

The use of elements in parallel in the larger sizes facilitates heat dissipation, thus making it possible to reduce the cross-sectional area of the element. By splitting one

element into two or more smaller ones, the amount of metal vapour to be disposed of on short circuit is reduced and the breaking capacity is increased.

The element or elements in the fuse link are contained in a ceramic barrel of exceptional strength and are surrounded by a filler of purified silica. The ends of the cartridges are closed by copper caps forced on to the precision-ground barrel under great pressure, thus eliminating the use of cement. In the larger sizes double end-caps are used, the fuse contact tags being riveted and soldered on to the outer caps. The end-caps and tags are electro-tinned.

### Adjustable Fitting for Spotlight

A new fitting introduced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, enables users to take full advantage of the possibilities offered by the "Osram" 150 W spotlight reflector lamp for lighting in shop windows, stores, displays, etc. The unit incorporates a universal movement enabling the lamps to be easily trained in any direction.

### Cooker Control Unit

Owing to a misarrangement in typesetting, part of the note under the above heading on page 398 of last week's issue read incorrectly. The second paragraph should have been worded as follows: "Alternatively, the unit can be supplied with 13 A ring-main socket or a Wylex ring-main socket, also with or without either pilot light or 15 A switch. If required, a 60 A cooker control switch is available, while, should it be desired to sink the unit, a flat lid can be supplied."

# Iranian Electrical Market

## OPPORTUNITIES FOR INCREASED TRADE

THERE are good opportunities for United Kingdom manufacturers of internal combustion engines, electric motors and generators, and industrial fans, to improve their supplies to Iran, providing delivery dates compare favourably with overseas competitors.

In a report on the Iranian market, published by the Commercial Relations & Exports Department of the Board of Trade, from information furnished by the Counsellor (Commercial) to H.M. Embassy, Tehran, it is stated that the biggest demand for diesel engines in Iran is for use in irrigation. Units of 50 to 60 h.p. are the most popular. The poor standard of electricity supplies, particularly in provincial towns, creates a demand for small engines of 5-15 h.p. to drive generators for house, estate and workshop supply. Similarly, engines of 500-600 h.p. are required for large generating stations Iranians prefer low speed (up to 650 r.p.m.) and semi-enclosed engines because their maintenance is simpler and with the poor lubricants use high-speed fully enclosed engines over-heat in Iran's climate. United Kingdom engines are preferred and have a good reputation for long service Some orders have been lost, however, because delivery terms do not compare favourably with those from U.S.A., Germany and Czechoslovakia.

Electric motors manufactured in the United Kingdom are popular and nearly all motors required for the expansion of the cotton spinning industry have been obtained from this country. In some cases deliveries have been reduced to 8-9 months. In the rest of the market the position has not been so satisfactory; keen American competition has been encountered with better deliveries, while the Belgians have recently entered the market offering deliveries in three months

The demand for generators for use in houses, workshops and small power stations is likely to increase; diesel engines are preferred to turbines. The usual power supply is 220 V a.c., 3-hpase, 50 cycles. The industrial demand for generators arises mainly from the textile industry, and provided delivery dates can be synchronized with the orders for textile machinery nearly all pending orders, estimated at over £200,000, will go to the United Kingdom.

Protracted deliveries are handicapping sales of U.K. transformers. There is a potential market for industrial fans.

## "Midlands Electricity"

A NEW magazine bearing this title is produced jointly by the Midlands Electricity Board and the Midlands Division of the British Electricity Authority. Messages welcoming the new journal are contributed by the chairman of the Board (Alderman W. Lewis) and the Divisional Controller (Mr. F. W. Lawton). The personal and social side of the staffs' activities is given most of the space and some good illustrations appear. An amusing feature is a "spoof" technical article which is very cleverly done. Another illustrated article shows how a derelict brickyard at Ocker Hill was converted into a pleasant sports ground with an ornamental lake.

# FINANCIAL SECTION

*Company News*
*Stock Exchange Activities*

## Reports and Dividends

**The Dubilier Condenser Co. (1925), Ltd.**—The annual meeting was held on 25th August, Mr. W. H. Goodman (chairman) presiding. In his statement which was circulated with the report and accounts, the chairman says that the fall in turnover has been accentuated by lower selling prices, higher basic rates for labour and the cost of social security. In addition the recession in the radio industry has resulted in their customers placing smaller orders. During the past year they have been confronted with changing conditions of trade both at home and abroad, and it would appear that the accumulated demand created during the war has been satisfied. As a consequence the value of outstanding orders is substantially lower than a year ago. There is an ever increasing demand for capacitors for industrial applications which their new designs and production methods are enabling them to meet satisfactorily. Export sales have been on a larger scale than any previous year and large inquiries are in course of negotiation, but there is increasing competition from other countries with exchange problems in almost every direction. The company has spent a considerable amount of time and money on the design and manufacture of capacitors for the elimination of electrical interference with television, radio, radar, etc., and is in a favourable position to deal with the demand arising as a result of the Wireless Telegraph Bill which will shortly become operative.

**Crompton Parkinson, Ltd.,** have declared dividends in respect of the three months ended 30th June last of 2 per cent and 1½ per cent on the first and second preference stocks respectively, payable on 30th September next. It was stated at the annual meeting of the company in January last that it was intended to change the dates of payment of the preference dividends from June and December to March and September, the change to be effected by a three months' dividend at the end of September.

**Hackbridge Cable Holdings, Ltd.,** reports a consolidated trading profit from 3rd September, 1948 (date of incorporation) to 31st March last of £259,898, and after deducting taxation, a combined net profit of £115,187. From this is deducted £50,889, proportion of profit accrued from 1st April, 1948, to date of acquisition by the holding company, including preference dividend (£412 net) paid on 1st July, 1948, to former shareholders, leaving an available balance of £64,298, less £25,464 retained by subsidiary companies. A dividend at the rate of 20 per cent per annum less tax, is paid on the ordinary shares. The balances carried forward are: Hackbridge Cable Holdings, £3,652; subsidiaries, £25,464, less £15,000 transferred to general reserve.

**Bendix Home Appliances, Ltd.,** reports profits for the year ended 31st March last, before tax, of £90,149, as compared with £65,023 for the preceding year. After providing £60,433 for taxation, placing £2,287 to investment reserve and providing £1,812 for capital increase expenses, there is a net profit of £41,367 (against £40,948), after crediting £15,750 service provisions no longer required. No ordinary dividend is recommended for the year. The company was made public in June, 1948.

**Brown Brothers, Ltd.,** have declared an interim ordinary dividend of 2½ per cent, less tax (against 5 per cent). In July last the ordinary capital was doubled by the issue of a 100 per cent capital bonus, and at the time the directors emphasized that the adjustment in the company's capital did not imply the intention to distribute an increased amount by way of dividend.

**Radiovisor Parent, Ltd.,** reports a trading profit for the year ended 31st March last of £4,544, plus provision for profits tax not required of £350, less audit fee, £74, and after providing £431 for depreciation, a balance of £4,389 is carried forward. In February last the capital was reduced from £41,350 to £22,116 and subsequently the authorized capital was increased to £100,000 by creating 1,557,680 ordinary 1s shares. The reduction of capital has been applied to eliminate the debit balance on profit and loss account at March, 1948, of £17,905, and to write down the value of patents, patent rights and trade marks by £1,329.

**The Nigerian Electricity Supply Corporation, Ltd.,** reports a revenue for the year ended 28th February last of £207,741, as compared with £158,439 for the preceding year, and after deducting operating cost, depreciation, etc., there is a balance of £112,782 (against £68,887), to which is added £20,780 brought in. Taxation requires £57,228, and general reserve receives

£25,000. The final dividend is 4 per cent, plus a bonus of 2 per cent, again making 10 per cent for the year, and £21,359 is carried forward.

**Thorn Electrical Industries, Ltd.,** reports a trading profit for the year ended 31st March last, including £3,895 from previous years, of £187,184, as compared with £199,123 for the preceding year, and a net profit of £51,959 (against £52,569). It is proposed to pay an ordinary of 20 per cent less tax, for the year (against 25 per cent).

**Aron Electricity Meter, Ltd.,** reports a trading profit for the year to 31st March last of £72,499, and after providing for taxation, depreciation, etc., there is a balance of £13,966. It is proposed to pay a dividend of 15 per cent for the year (unchanged), and to carry forward £26,929. In the previous year the profit, after tax, was £27,289, when £12,500 was placed to general reserve, and after paying the dividend, a balance of £25,498 was carried forward.

**The Greengate & Irwell Rubber Co., Ltd.,** is paying an unchanged interim dividend of 7½ per cent.

**The Rheostatic Co., Ltd.,** has declared an interim dividend of 6 per cent (unchanged).

**W. Canning & Co., Ltd.,** are again paying an interim dividend of 5 per cent.

## New Companies

**Britonic Products, Ltd.**—Registered 18th August. Capital £999. Manufacturers of and dealers in electrical, radio, electronic, mechanical and other devices and equipment, electrical fittings, hardware, ironmongery, etc. Directors: A. Churchill, K. D. R. Gibbs and Margaret A. Greenfield. Regd. office: 1, Glenfrome Road, Eastville, Bristol.

**C. Drewery (Electrical), Ltd.**—Registered 18th August. Capital £1,500. Electricians, electrical and wiring contractors, electrical, radio and television engineers, etc. Directors: C. Drewery and Mrs. Miriam E. Drewery. Regd. office: County Buildings, Land of Green Ginger, Hull.

**Safety Electrical Accessories, Ltd.**—Registered 8th July. Capital £100. Electrical switchgear designers, patentees, engineers, etc. Subscribers: V. R. Aram and W. V. Thomson. Regd. office: 16, Clapham Junction Approach, S.W.11.

**Madewel Products, Ltd.**—Registered 12th August. Capital £1,000. Electrical engineers, electrical installation contractors, etc. Directors: N. Holland and F. H. Hancock. Regd. office: 4, North Parade, Sale, Ches.

**United Electric Company (Birmingham), Ltd.**—Registered 19th August. Capital £500. Electricians, manufacturers and producers of and wholesale and retail dealers in electric lamps, fittings, electroliers and appliances, lamp-shades, valves, stoves and irons, etc. Subscribers: E. H. J. Chambers and J. F. Bell. Regd. office: 89, Jamaica Road, Birmingham.

## Increases of Capital

**Ferranti, Ltd.**—Increased by £1,600,000, in 1,000,000 5 per cent second redeemable cumulative preference shares of £1 and 1,200,000 ordinary shares of 10s beyond the registered capital of £900,000. On 8th August 500,000 5 per cent second redeemable cumulative preference shares of £1 and 400,000 ordinary shares of 10s were converted into stock.

**Patterson Lamps, Ltd.**—Increased by £10,000, in 10,000 cumulative preference shares of £1, beyond the registered capital of £25,000.

**Long & Crawford, Ltd.**—Increased by £15,000 in £1 shares, beyond the registered capital of £5,000.

**Igranic Electric Co., Ltd.**—Increased by £615,000, in £1 shares, beyond the registered capital of £135,000.

**Hackbridge and Hewittic Electric Co., Ltd.**—Increased by £300,000 in 5s ordinary shares, beyond the registered capital of £800,000.

## Liquidations

**O'Connor Electrical Industries, Ltd.**—Particulars of claims by 12th September to the liquidator, Mr. L. V. Russell, Abbott's Chambers, 202, Bishopsgate, London, E.C.2. Creditors whose claims have already been agreed need not prove again.

## Bankruptcies

**J. H. Trevithick,** electrician, a partner in the firm Power, Light & Sound, 51, Fore Street, Callington, Cornwall.—Receiving order made 15th August on debtor's own petition.

**C. H. F. Thick,** lately carrying on business at 1, Nun's Walk, Winchester, in partnership with S. W. West, under the name of West & Thick, as electrical engineer.—First and final dividend of 6s 9½d in the £, payable 6th September at the Official Receiver's office, 10, Rockstone Place, Southampton.

**J. V. Figgins,** 3, Pottery Terrace, Alexandra Road, Newport, Mon., electrical engineer.—Last day for receiving proofs for dividend 10th September. Trustee: Mr. R. Betts, 34, Park Place, Cardiff, Official Receiver.

# FINANCIAL SECTION
# STOCKS and SHARES

THE word to conjure with in the Stock Exchange markets at the present time is "devaluation." Upon the likelihood, or the unlikelihood, of this being officially adopted, depend the opinions of all who are interested in finance and economics. A material rise in British Government securities, including British Transport and British Electricity stocks, is held to be a reflection of an increasing view that devaluation will be avoided, in spite of the fact that returned travellers from the United States tell of a very general opinion in New York that some kind of devaluation is inevitable.

### Devaluation Implications

On this side, Sir Stafford Cripps is bitterly opposed to the idea, and, at next week's meeting, it will be extremely difficult for him to change his mind without denying all that he had previously said on the subject. Devaluation would probably mean, put shortly, a fall in gilt-edged and fixed-interest stocks and shares, together with a general rise in ordinary shares, or "equities." Outside the financial sphere, it would imply a rise in prices, and the creation of widespread disturbance. In all the circumstances, it is difficult to account for the abruptness of the rise which lifted consols, for instance, from 68½ to 75 in the course of a few weeks. The reaction in gilt-edged stocks aroused, therefore, no great surprise last Monday.

### "Nationalization" and Other Stocks

Falls in the prices of the "nationalization" stocks typify this year's sorry performance of gilt-edged securities. Cable & Wireless ordinary, on the strength of reorganization prospects, is among the few stocks on which holders can see appreciation:—

| Stock | End-Dec 1948 | End-Aug 1949 | Change |
|---|---|---|---|
| British Electricity 3% 1968–73 ... | 102⅞ | 94½ | − 8½ |
| " 3% 1974–77 ... | 101½ | 94 | − 7½ |
| Brit. Transport 3% 1978–88 ... ... | 100 | 92 | − 8 |
| Cable & Wireless Ord. | 215 | 230 | +15 |
| Cable & Wireless Pref. | 125½ | 107 | −18½ |
| Anglo-American Tel. Pref. ... ... | 122½ | 106 | −16½ |
| Marconi Marine ... | 31/– | 25/9 | −5/3 |

### Equipment and Manufacturing

In the electrical market, many shares in the radio and light engineering sections show severe depreciation: but, with evidence of continuously active conditions in the heavy branches, the retreat of the leading electrical equipment shares has been more orderly than that of the gilt-edged market:—

| Ordinary Share | End-Dec 1948 | End-Aug 1949 | Fall |
|---|---|---|---|
| A.E.I. ... ... | 78/3 | 71/6 | 6/9 |
| Automatic Tel. ... | 63/3 | 59/6 | 3/9 |
| B.I.C. ... ... ... | 36/– | 32/– | 4/– |
| Brush ... ... ... | 7/3 | 6/– | 1/3 |
| Crompton Parkinson | 27/6 | 23/6 | 4/– |
| Cossor ... ... | 11/– | 5/6 | 5/6 |
| English Electric ... | 48/9 | 45/– | 3/9 |
| E.M.I. ... ... ... | 20/6 | 15/– | 5/6 |
| Ever Ready ... ... | 37/– | 27/6 | 9/6 |
| G.E.C. ... ... | 90/– | 80/6 | 9/6 |
| Henleys ... ... | 25/– | 23/6 | 1/6 |
| Reyrolle ... ... | 61/3 | 56/3 | 5/– |
| Siemens ... ... | 35/6 | 31/3 | 4/3 |

### Thorn Electrical Industries

There has been no change in the official quotation of 16s 3d for this company's 5s shares since the reduction of the dividend from 25 to 20 per cent; but the market has widened the dealing price far enough to discourage activity until the reason for the dividend cut is made clear. The explanation is not to be found in the preliminary profits statement; the net profit of £52,000, for the year ended last March, is only £600 below the previous year's. After becoming public in 1936, the company paid an uninterrupted line of well-covered 20 per cent dividends, rising to 25 per cent for the two years preceding that just ended. The last balance sheet was strong in reserves and liquid assets.

### The Month's Fluctuations

It will be seen from the overleaf table of prices that the changes on the month are substantially less than those which occurred in the previous period, when practically every item in our lists underwent alteration—nearly all in the lower direction. This time, Falk Stadelmann at 37s are 4s 3d down, and Westinghouse Brake are 2s 6d off at 62s. Ward & Goldstone are 5s 6d lower at 44s 6d. A reduction of 8s 9d in Telegraph Construction shares is due to the price being quoted ex the new shares. British Electric Traction deferred has risen 30 points. Vactrics are a florin higher at 15s 9d. A similar improvement lifted Enfield Cables to 28s 3d. The falls on the month outnumber the rises by about 2 to 1: the fluctuations, in either direction, are mostly small apart from those just mentioned.

# Electrical Investments

## Past Month's Price Changes

| Company | Dividend: Previous | Dividend: Last | Middle Price 29th Aug. 1949 | Month's Rise or Fall | Yield p.c. |
|---|---|---|---|---|---|
| *Overseas Electricity Companies* | | | £ s. d. | | |
| Atlas Elec. ... | 2 | 2½ | 12/– | +6d. | 4 3 4 |
| Calcutta Elec. ... | 6† | 6† | 25/– | +1/– | 4 16 0 |
| Cawnpore Elec. ... | 13 | 10 | 35/– | –⅛ | 5 14 3 |
| East African Power | 7 | 7 | 40/9 | +5/– | 3 8 8 |
| Jerusalem Elec. ... | 5 | 6 | 17/6 | –6d. | — |
| Madras Elec. ... | 8 | 5 | 25/– | –⅛ | 4 0 0 |
| Nigerian Elec. ... | 12½ | 10 | 31/9 | +6d. | — |
| Palestine Elec. "A" | 7† | Nil | 30/6 | +6d. | — |
| Perak Hydro-elec. | Nil | Nil | 10/6 | +1/– | — |
| Whitehall Inv. Pref. | — | 6 | 23/– | –2/– | 5 4 4 |
| *Equipment and Manufacturing* | | | | | |
| Aberdare Cables ... | 10 | 15 | 49/6 | –1/9 | 6 1 0 |
| Aron Elec. Ord. ... | 15 | 15 | 40/-xd | –1/– | 7 10 0 |
| Assoc. Elec. Ord. ... | 15 | 15 | 71/6 | –4/9 | 4 4 3 |
| Automatic Tel. & El. | 12½ | 12½ | 59/6 | –⅛ | 4 4 6 |
| Babcock & Wilcox | 15 | 15 | 57/3 | +1/9 | 5 5 0 |
| Baldwin, H. J. (2/–) | 25 | 25 | 6/3xd | — | 8 0 0 |
| British Aluminium | 10 | 10 | 43/– | –9d. | 4 13 0 |
| B.I. Callender's ... | 6¾ | 6¾ | 32/– | +2/– | 4 7 0 |
| British Thermostat (5/–) ... ... | 23½ | 25 | 23/9 | –⅛ | 5 5 3 |
| British Vac. Cleaner (5/–) ... ... | 20 | 20 | 8/– | –⅛ | 12 10 0 |
| Brush Ord. (5/–) ... | — | 10 | 6/– | +9d. | 8 6 9 |
| Burco (5/–) ... | 35 | 35 | 18/9 | +⅛ | 9 6 8 |
| Chloride El. Storage | 20 | 20 | 92/6 | –¼ | 4 6 7 |
| Cole, E. K. (5/–) ... | 22½ | 20 | 10/9 | –9d. | — |
| Cossor, A. C. (5/–)... | Nil | Nil | 5/6 | –1/– | — |
| Crabtree (10/–) ... | 17½ | 17½ | 32/6 | –6d. | 5 7 8 |
| Crompton Parkinson Ord. (5/–) ... | 22½ | 22½ | 23/6 | –6d. | 4 15 9 |
| De La Rue (5/–) ... | 50 | 50 | 25/9xd | — | 9 14 2 |
| Decca (1/–) ... | 112½ | 112½ | 13/9 | +9d. | 8 3 9 |
| E.M.I. (10/–) ... | 6 | 8 | 15/– | +6d. | 5 6 8 |
| Electrical Components (5/–) ... | 20 | 20 | 10/9 | –1/9 | 9 6 0 |
| Elec. Construction | 12½ | 12½ | 49/6 | –6d. | 5 0 10 |
| Enfield Cable Ord. | 7½ | 7½ | 28/3 | +2/– | 5 7 2 |
| English Electric ... | 10 | 10 | 15/– | +6d. | 4 9 0 |
| Ericsson Tel. (5/–) | 20† | 20† | 41/3 | –9d. | 2 8 7 |
| Ever Ready (5/–) | 40 | 40 | 27/6 | –6d. | 7 5 6 |
| Falk Stadelmann ... | 15 | 15 | 37/– | –4/3 | 8 2 2 |
| G.E.C. Ord. ... | 17½ | 17½ | 80/6 | –1/– | 4 7 1 |
| General Cables (5/–) | 50 | 50 | 20/– | — | — |
| Greenwood & Batley | 15 | 15 | 46/3 | –⅛ | 6 9 10 |
| Hackbridge Cable (5/–) ... ... | — | 20 | 13/3 | –⅛ | 7 10 0 |
| Hackbridge Hewittic (5/–) ... ... | 12 | 12½ | 11/– | +3d. | 5 13 8 |
| Hall Tel. Acc. (10/–) | 10 | 10 | 13/– | –6d. | 7 13 10 |
| Heatrae (2/–) ... | 12½ | 12½ | 4/– | –1/– | 6 5 0 |
| Henleys (5/–) ... | 20 | 20 | 23/6 | +1/– | 4 5 1 |
| Hoover (5/–) ... | 40 | 40 | 28/9 | +6d. | 6 19 0 |
| Intl. Combustion (5/–) ... ... | 37½ | 37½ | 43/9 | +⅛ | 4 5 7 |
| Johnson & Phillips | 15 | 15 | 62/6 | –6d. | 4 16 0 |
| *Equipment and Manufacturing (continued)* | | | £ s. d. | | |
| Lancashire Dynamo | 22½ | 22½ | 95/– | +⅛ | 4 14 3 |
| Laurence, Scott (5/–) | 12½ | 12½ | 12/3 | –1/– | 5 2 1 |
| London Elec. Wire | 10 | 10 | 44/– | –6d. | 4 11 6 |
| J. Lucas ... ... | 17½ | 17½ | 73/9 | +⅛ | 4 15 1 |
| Mather & Platt ... | 11 | 11 | 48/9 | –2/– | 4 10 2 |
| Metal Industries ... | 10 | 10 | 42/6 | +⅛ | 4 14 1 |
| Mid. Elec. Mfg. ... | 35 | 35 | 8½ | +½ | 4 5 6 |
| Murex ... ... | 20 | 20 | 95/-xd | +⅛ | 4 4 2 |
| Newman Ind. (2/–) | 22½ | 17½ | 4/– | –3d. | 8 4 6 |
| Oldham & Son (1/–) | 60 | 60 | 9/6 | +9d. | 6 6 4 |
| Plessey (5/–) ... | 30 | 20 | 13/9 | –9d. | 7 5 5 |
| Parsons C. A. ... | 12½ | 12½ | 58/9 | –⅛ | 4 5 6 |
| Pye Deferred (5/–) | 25 | 25 | 27/6 | +⅛ | 4 11 6 |
| Radio & Tel. (2/–) | Nil | 25 | 2/– | –6d. | — |
| Revo (10/–) ... | 27½ | 27½ | 50/– | +½ | 5 10 0 |
| Reyrolle ... ... | 12½ | 12½ | 56/3 | –⅛ | 4 9 0 |
| Scophony Baird (1/–) | — | — | 2/6 | –6d. | — |
| Scot. Cable (4/–) ... | 30 | 30 | 22/6 | –6d. | 5 5 6 |
| Siemens Ord. ... | 7½ | 7½ | 31/3 | –⅛ | 4 16 6 |
| Switchgear & Cowans (5/–) ... ... | 20 | 20 | 12/– | –6d. | 8 6 8 |
| T.C.C. (10/–) ... | 15 | 15 | 32/6 | –⅛ | 4 12 4 |
| T.C. & M. ... ... | 10 | 10 | 41/3xr | — | — |
| Telephone Mfg. (5/–) | 9 | 9 | 8/6 | –3d. | 5 6 0 |
| Thorn Elec. (5/–) ... | 25 | 20 | 16/3 | +⅛ | 6 3 1 |
| Tube Investments | 25 | 25 | 5⅛ | — | 4 8 0 |
| Vactric (5/–) ... | Nil | Nil | 15/9 | +2/– | — |
| Veritys (5/–) ... | 5 | 5 | 2/9 | +3d. | 9 1 10 |
| Walsall Conduits (4/–) ... ... | 70 | 70 | 56/3 | –⅛ | 4 19 8 |
| Ward & Goldstone (5/–) ... ... | 50 | 50 | 44/6 | –5/6 | 5 13 1 |
| Watford (2/–) ... | 15 | 20 | 6/– | –¼ | 6 13 4 |
| Westinghouse Brake | 14 | 14 | 62/– | –¼ | 4 10 4 |
| West, Allen (5/–) ... | 10 | 10 | 10/8 | –3d. | 4 17 7 |
| *Transport and Communications* | | | | | |
| Anglo-Am. Tel.: Pref. ... ... | 6 | 5⅝ | 106 | –3 | — |
| Def. ... ... | 1½ | 1½* | 17½ | +3 | — |
| Anglo-Portuguese | 8 | 8 | 23/9 | –6d. | 6 14 |
| Brit. Elec. Traction: Def. Ord. ... | 50 | 50 | 1605 | +30 | 3 2 |
| Calcutta Trams ... | 10 | Nil | 22/6 | +½ | — |
| Cape Elec. Trams | 6 | 6 | 23/6 | +1/– | 5 2 |
| Cable & Wireless: 5½ Pref. ... | 5½ | 5½ | 107xd | –1½ | 5 10 |
| Ord. ... ... | 4 | 4 | 230 | –½ | — |
| Globe Tel. & Tel. Ord. | 5† | 5† | 40/– | –4/– | 2 10 0 |
| Great Northern Tel. (£10) ... ... | 12 | 7 | 12 | –½ | 5 16 8 |
| Inter. Tel. & Tel.... | Nil | Nil | 15 | +2 | — |
| Marconi Marine ... | 7½ | 7½ | 25/9 | +9d. | 5 16 6 |
| Oriental Tel. Ord.... | 10 | 16 | 44/6 | –⅛ | 7 4 0 |
| Telephone Props ... | 6 | 6 | 9/6 | –1/9 | 12 12 8 |
| Tele. Rentals (5/–) | 10 | 10 | 9/6 | –3d. | 5 5 3 |

*Dividend postponed.

†Dividends are paid free of Income Tax.

# Electricity Supply

## B.E.A. Contracts : Magistrates Decide South Wales Dispute

DURING the past month contracts have been placed for generating station, switching and transforming station and transmission equipment amounting in the aggregate to £1,828,440. The principal contracts include: 132 kV and lower voltage cables, Poole generating station (Pirelli-General Cable Works, Ltd.); structural steelwork, No. 3 section, Staythorpe station (Dorman, Long & Co., Ltd.); administration block superstructure, Croydon "B" station (Sir Robert McAlpine & Sons, Ltd.); structural steelwork, Accrington station (Simon Carves, Ltd.); 132 kW overhead line, East Yelland-Taunton (British Insulated Callender's Cables, Ltd.); and 33 kV, 1,000 MVA switchgear, Bolton station (British Thomson-Houston Co., Ltd.).

### Board to Remove Poles

The South Wales Electricity Board was recently summoned by the Glamorgan County Council for "erecting an electrical pole in a dangerous position." Actually the four 36ft poles concerned were put up 39 years ago with the consent of the highway authority, and the main purpose of the present "friendly action" between the County Council and the Board was to decide who should pay for the cost of their removal. The magistrates at Caerphilly, after a hearing lasting nearly two hours, decided that the Board should remove the poles at its own expense. Mr. J. Hindle Fisher, for the Board, submitted that if there were danger to the public safety it was because of the combination of the Council's narrow road, the camber of the road, and the poles. An official of the Board said it would cost £425 to remove the poles and provide alternative accommodation for an electricity line.

### All-Electric Beach Huts

Time spent on domestic chores on holiday is, in most people's opinion, time wasted, and electricity can play a big part in lightening the load, as holiday-makers who have stayed in the all-electric beach huts at Dunster, Somerset, in the South Western Board's area, can testify. On the foreshore are 185 beach huts which are taking lighting and power supplies, and the accompanying picture shows a typical installation in one of the huts. When this supply was first given, a 50 kVA transformer was installed, but the load has progressively developed as hut-owners discovered that electricity was an important selling factor in letting and a 150 kVA unit is now used. The substation enclosure has been made to harmonize, as far as possible, with the surroundings. Chestnut fencing has been employed and the growth of trees around the enclosure has been encouraged.

An electrically equipped beach hut

### Opening of New Walsall Station

The Mayor of Walsall (Councillor T. P. Riley, J.P.), is to perform the opening ceremony at the new station at Birchills, Walsall, on 30th September.

### Lighting Controversy

While a scheme for electric lighting at Barmouth still awaits the approval of the Ministry of Transport, the Urban District Council has been informed by the gas authority that because of labour shortage gas cannot be supplied for street lighting next winter. The Council submitted its scheme for electric lighting to the Ministry in January and after a conference in June the

proposals were amended. In August the Ministry wrote that the maximum space between the lamp standards should not exceed 100ft if 300 W filament lamps were used, or 120-130ft with 500 W lamps. The Council replied that its scheme was more than adequate for the narrow main road and asked the Ministry to give the question further and urgent consideration.

### *Electricity Output*

The weekly statement of the Ministry of Fuel and Power shows that 727.4 million kWh was sent out from solid fuel-fired stations of the B.E.A. and North of Scotland Hydro-Electric Board in the week ended 19th August last, as compared with 717.4 million kWh for the preceding week and 706.9 million in the week ended 20th August, 1948.

### *Gas to Electricity at Hinckley*

After considering quotations from the West Midlands Gas Board and the East Midlands Electricity Board, the Hinckley Urban District Council has decided to adopt electricity for street lighting on its new housing estate at Sketchley Hill. It will be the first electric street lighting installed by the Council, and Councillor G. Brast, chairman of the Public Lighting Committee in submitting the quotations, said that the change from gas to electricity was being made on the grounds of economy.

### *Mansion for Offices*

Castle Malwood, in the New Forest, near Minstead, is being acquired by the Southern Electricity Board for use as district offices.

### *Electric Boilers in Council Houses*

The attention of the Ennerdale (Cumberland) Rural Council has been drawn, by Distington Parish Council, to the fact that 210 new houses at Distington have no boilers and the Council has been asked to install an electric boiler in each house.

### *Standardization in Scotland*

The South West Scotland Electricity Board has publicly announced its intention to standardize the voltage in the West of Scotland at 240—the national standard. At present the voltages range from 230 to 250. The change will affect consumers of the former undertakings in Glasgow, Dumbarton, Greenock, Hamilton, Motherwell and Wishaw, Paisley and the Clyde Valley Electrical Power Co.

### *Illuminations at Sunderland*

The first illuminations organized by the Sunderland Town Council at Roker since before the war are to be inaugurated on 3rd September. The cost has been £5,700. Difficulty has been experienced this year in getting deliveries of equipment on time from manufacturers and much of the equipment used has been salvaged from pre-war stock.

### *Local Consultative Committees*

The Eastern Electricity Consultative Council has appointed local committees for the Eastern Electricity Board's Sub-Areas—Suffolk, Fens, Chilterns, Northmet, Norfolk and Essex. At the first meetings of the Committees it was decided that normally they would meet bi-monthly.

### *Northern Ireland Strike*

About 2,500 electricity workers of the Belfast and Londonderry Corporations and the Northern Ireland Electricity Board are to strike for increased pay. At a meeting in Belfast on 29th August 700 representatives from Belfast and adjoining towns voted in favour of strike action, already decided on by Londonderry and other areas. The men demand an increase of 1½d per hour, such as has already been granted by the Electricity Authorities in England.

Leaders of the four unions met in Belfast on Tuesday last and agreed that the decision to go on strike should become operative on Tuesday, 6th September.

### *Electrical Tests in Bungalows*

Over half of the Manchester Corporation's pre-fabricated bungalows are of the aluminium type; there are 1,542 of them. In conjunction with the electricity supply authorities the Housing Committee has arranged for the testing of the electrical equipment to ensure that there is no risk of trouble. This follows upon a recent case in Devon when the tenant of an aluminium "prefab" received an electric shock when entering his house.

### *Indian Hydro-Electric Loan*

India is seeking from the International Bank a loan of $81 million (£20,250,000 sterling) for hydro-electric projects. Of this total $22 million (£5,500,000) will be for the Damodar Valley project and $59 million (£14,750,000) for the Bhakra and Nangal projects. The Damodar Valley project covers Bihar and West Bengal Provinces and the Bhakra and Nangal projects are in East Punjab Province.—*Reuter* (New Delhi).

### *Assouan Project Suspended*

According to the Cairo Correspondent of the *Daily Telegraph*, the Egyptian Government has decided temporarily to shelve the Assouan Dam hydro-electric and the Qena irrigation schemes to give Hussein Sirry Pasha's new Cabinet an opportunity to investigate them fully.

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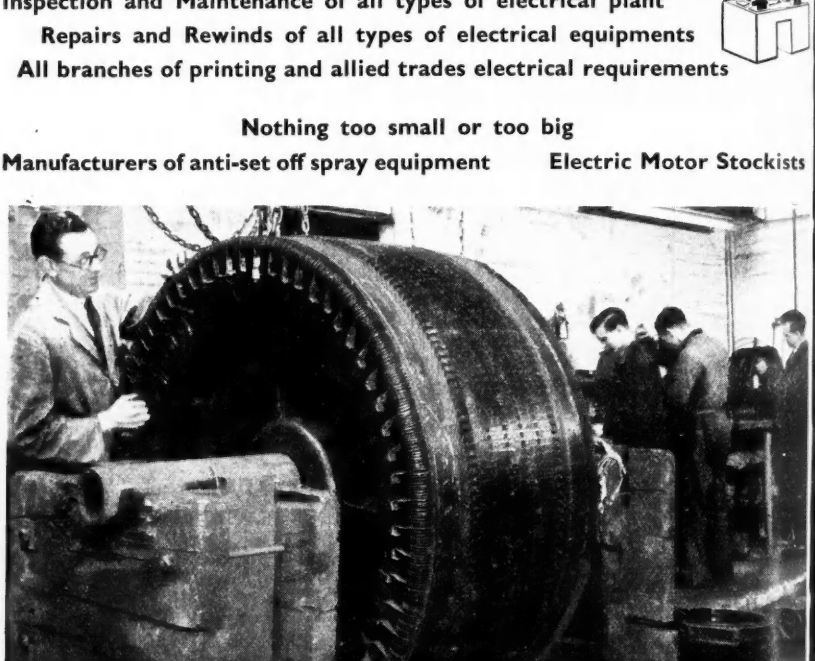

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# NEW PATENTS

## Electrical Specifications Recently Published

*The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.*

### 1944

23153. Miles Aircraft, Ltd., Boyd, A. G. V., and Egby, R. G.—Selecting and actuating mechanism for electric switches, valves, and like control devices. 21st November, 1944. (Cognate application 30911/45.) (627545.)

### 1945

477. British Thomson-Houston Co., Ltd.—Protection of electrical apparatus. 5th January, 1944. (627476.)

1605. British Thomson-Houston Co., Ltd.—Electric supply systems employing storage batteries. 21st January, 1944. (627548.)

1708. Sperry Gyroscope Co., Inc.—Electric systems responsive to the rate-of-change of alternating-current signals. 22nd January, 1944. (627686.)

7136. British Thomson-Houston Co., Ltd.—Electric overload relays. 22nd March, 1944. (627688.)

11804. Sperry Gyroscope Co., Inc.—Electrical-discharge means particularly pulse-generating means and blocking oscillators for use therewith. 10th May, 1944. (627404.)

14891. Patelhold Patentverwertungs- & Elektro-Holding Akt.-Ges.—Arrangement for determining the direction of motion of moving bodies according to the reflected wave principle. 1st June, 1944. (627550.)

15318. Compagnie Générale de Télégraphie sans Fil.—Means for detecting the presence of objects by means of electro-magnetic waves. 26th November, 1943. (627690.)

15906. Marconi's Wireless Telegraph Co., Ltd.—Wireless antenna. 4th May, 1942. (627689.)

17845. Igranic Electric Co., Ltd.—Electric motor control systems. 12th July, 1944. (627479.)

18371. British Thomson-Houston Co., Ltd.—Arc extinguishing apparatus for electric current interrupters. 18th July, 1944. (627480.)

18373. British Thomson-Houston Co., Ltd.—Starters for electric-discharge devices and circuits therefor. 26th July, 1944. (627691.)

19401. British Thomson-Houston Co., Ltd.—Electromagnetic protective relays. 5th August, 1944. (627552.)

20529. Walter, W. G., and Baldock, G. R.—Frequency selective, thermionic valve circuits. 10th August, 1945. (627481.)

20756. General Electric Co., Ltd., Jesty, L. C., and Henderson, J. R.—Cathode-ray tubes. 13th August, 1945. (627482.)

24999. Alkan, M. L.—Electrodes for electro-deposition purposes. 26th September, 1945. (Cognate applications 31397/45 and 25650/46.) (627484.)

27306. Harrison, R.—Mechanism for automatic adjustment, to preselected settings of movable elements such as tunable components in radio and like electrical circuits. 18th October, 1945. (627692.)

29152. British Thomson-Houston Co., Ltd. (Timmerman, J. W.).—Fluid-operated electric circuit-breakers. 2nd November, 1945. (627485.)

32578. British Thomson-Houston Co., Ltd.—Phase-shifting transformer connections. 4th December, 1944. (627694.)

33177. Tomlins, F. C. (Western Electric Co., Inc.).—Apparatus for indicating complex waves in visual form. 7th December, 1945. (627486.)

### 1946

1651. British Thomson-Houston Co., Ltd.—Lamp holders for tubular electric lamps. 22nd January, 1945. (627556.)

6211. Marconi's Wireless Telegraph Co., Ltd.—Electrical pulse discriminating circuits. 6th October, 1944. (627696.)

10802. Citroen, A., and Minvielle, C. G. E. L.—Means for connecting electric cables. 8th March, 1946. (627564.)

13166. Philips Lamps, Ltd.—Electric-discharge tubes furnished with luminescent material. 1st May, 1945. (627497.)

17126. P.R.T. Laboratories, Ltd., Baybut, H., and Gale, A. J.—Television receiving apparatus. 5th June, 1946. (627568.)

17782. Vigren, S. D., and Holmqvist, N. E. F.—Manufacture of blade spring assemblies and the like for electrical switching devices. 13th June, 1945. (Cognate applications 17783/46, 17784/46 and 17785/46.) (627570.)

22324. Philips Lamps, Ltd.—Semi-conducting resistances provided with metal contacts. 30th July, 1945. (627576.)

23188. Automatic Telephone & Electric Co., Ltd., and Baker, G. T.—Electrical signalling systems. 3rd August, 1946. (627577.)

26803. Tama, M.—Heating inductor coils for use in induction furnaces. 29th September, 1945. (627507.)

28634. Concordia Electric Safety Lamp Co., Ltd., and Cornish, J. P.—Electric socket-switches. 25th September, 1946. (627714.)

29637. Mena y Vieyra de Abreu, J.—Concentric contact electric plug-and-socket connections. 4th October, 1945. (627587.)

29704. Sadir-Carpentier.—Thermionic valve sawtooth wave generators. 7th May, 1945. (627588.)

30271. Western Electric Co., Inc.—Cavity resonators. 12th May, 1945. (627513.)

30348. Columbia Broadcasting System, Inc.—Colour television. 13th December, 1940. (627592.)

32966. Postlethwaite, F.—Electric indicating or measuring instruments of moving-coil type. 6th November, 1946. (627598.)

33110. Igranic Electric Co., Ltd.—Electrical timing relays. 7th November, 1945. (627723.)

34443. Begwaco Meters, Ltd., and Butterworth, E.—Coin mechanism of prepayment meters. 20th November, 1946. (627725.)

35189. Westinghouse Electric International Co.—Telemetering or remote metering systems. 15th December, 1945. (627605.)

35771. Power Jets (Research & Development), Ltd., and Walker, D. N.—Gas turbine power units. 3rd December, 1946. (627522.)

36066. Marconi's Wireless Telegraph Co., Ltd., and Mortley, W. S.—Piezo-electric crystal circuit arrangements. 5th December, 1946. (627608.)

36357. Holden, A. de F.—Thermocouple construction. 17th January, 1946. (627610.)

36645. Sadir-Carpentier.—Sawtooth wave-form generators, using thermionic valves. 30th April, 1945. (Cognate application 36646/46.) (627614.)

36997. Philips Lamps, Ltd.—Transceivers. 5th January, 1944. (627407.)

37129. Levy, M. M.—Valve voltmeter circuits. 17th December, 1946. (627615.)

### 1947

1128. Compagnie pour la Fabrication des Compteurs et Matériel d'Usines a Gaz.—Television transmitting tubes. 10th September, 1946. (627528.)

2455. Philips Lamps, Ltd.—Variable electric resistances. 29th January, 1944. (627409.)

2466. Hass, Z. K., and Coop, E.—Electronic circuits. 27th January, 1947. (627623.)

2572. Pye, Ltd., and Weighton, D.—Hybrid transformer for very high frequencies. 28th January, 1947. (627410.)

2912. Cinema-Television, Ltd., and Sowerby, J. M.—Time base circuits. 30th January, 1947. (627411.)

3070. Westland Aircraft, Ltd., and Swaffield, P. J.—Electric motor control systems. 31st January, 1947. (627625.)

3573. British Thomson-Houston Co., Ltd., and Bird,

A. E.—Thermal responsive electric switches. 6th February, 1947. (627534.)

3636. Westinghouse Electric International Co.—Ultra-high-frequency devices. 6th March, 1942. (627746.)

3936. Saunders, F. S.—Fluid pressure gauges. 11th February, 1947. (627536.)

3955. Philco Corporation.—Frequency modulation radio receivers. 26th February, 1946. (627412.)

4078. Walsall Conduits, Ltd., and Gough, E.—Electric tumbler switches. 12th February, 1947. (627627.)

5134. Standard Telephones & Cables, Ltd.—Polyphase frequency modulators. 1st September, 1945. (627630.)

5410. Bader, K. E.—Temperature-controlled electric soldering irons. 25th February, 1947. (627631.)

6051. Hotpoint Electric Appliance Co., Ltd., and Wray, F. R.—Cabinet or table structure and ironing equipment combined therewith. 3rd March, 1947. (627538.)

8895. General Electric Co., Ltd., Lamont, H. R. L., and Robertshaw, R. G.—Electrical standing-wave detectors. 1st April, 1947. (627638.)

9061. Cole, Ltd., E. K., and Hutchings, E. L.—Moving-coil loudspeakers. 3rd April, 1947. (627639.)

9075. Western Electric Co., Inc.—Method of and apparatus for sealing the vulcanizing chamber of continuous vulcanizing apparatus. 6th April, 1946. (627427.)

9873. Imperial Chemical Industries, Ltd., and Ashcroft, D. G.—Electric igniters for use in electric initiating devices for explosive, incendiary and like compositions. 14th April, 1947. (627431.)

9932. British Mechanical Productions, Ltd., and Deakin, S. T.—Thermionic valve holders. 14th April, 1947. (627641.)

9992. General Electric Co., Ltd., and Donelan, J. A.—Welding of metal. 15th April, 1947. (627432.)

11635. Kent, Ltd., G.—Manufacture of glass electrodes. 9th May, 1946. (Addition to 574029.) (627442.)

12496. Westinghouse Brake & Signal Co., Ltd., and Walker, A. H. B.—Apparatus for operating devices having a negative resistance characteristic from an alternating electric current supply circuit. 8th May, 1947. (627646.)

12826. Landis & Gyr Soc. Anon.—Contactor mechanism controlled by an electric meter. 20th May, 1946. (627445.)

14068. Bruce Peebles & Co., Ltd., and Rodger, J. W.—Laminated electromagnetic cores. 27th May, 1947. (627446.)

17346. Glover & Co., Ltd., W. T., and Dixon, N.—Electric cables. 1st July, 1947. (627660.)

19484. Radio Corporation of America.—High-frequency heating apparatus for strip material. 31st May, 1941. (627455.)

20713. Terrell, J. R. F.—Electric heating units. 31st July, 1947. (627670.)

21100. British Thomson-Houston Co., Ltd.—Electrical conductors. 3rd August, 1946. (627459.)

21925. Standard Telephones & Cables, Ltd.—Electric impulse communication systems. 10th August, 1946. (Cognate application 21926/47.) (627462.)

21989. Marconi's Wireless Telegraph Co., Ltd.—Optical projection systems. 29th November, 1940. (627673.)

23794. Frost & Co., Ltd., H., and Perrigo, A. E. B.—Means for closing the winding slots of dynamo-electric machines. 28th August, 1947 (627679.)

25373. Chloride Electrical Storage Co., Ltd., Gray, R., and Jones, H. C.—Terminal arrangements for electric accumulators. 17th September, 1947. (627681.)

25467. Burney, Sir C. D.—Quick-freezing apparatus. 18th September, 1947. (627465.)

25566. General Electric Co., Ltd., and Stenning, L. C.—Radio receiver systems. 19th September, 1947. (627468.)

25616. Automatic Telephone & Electric Co., Ltd., and Rayner, T. R.—Automatic pressure-operated valve mechanisms in gas-filled cables and signalling devices associated therewith. 19th September, 1947. (627469.)

25690. Pirelli Soc. per Azioni, — Electric cables. 10th March, 1944. (627470.)

25782. Walsall Conduits, Ltd., and Court, R. A. B.—Enclosed electric switchgear. 23rd September, 1947. (627682.)

**1948**

13610. Compagnie Générale de Télégraphie sans Fil.—Systems for measuring the bearing angle and range of an object in devices for detecting the presence of objects by means of electromagnetic waves. 26th November, 1943. (Divided out of 627690.) (627749.)

14255. Compagnie Générale de Télégraphie sans Fil.—Devices for detecting the presence of objects by means of electromagnetic waves. 26th November, 1943. (Divided out of 627690.) (627750.)

30510. Automatic Telephone & Electric Co., Ltd., and Baker, G. T.—Electrical signalling systems. 3rd August, 1946. (Divided out of 627577.) (627613.)

## Trade Marks

RECENT applications for the registration of trade marks include the following, objections against which may be entered within one month from the dates stated:—

**17th August**

INTELEX. No. 674,657. Class 9. Electrically operated apparatus for the recording and booking of seating accommodation in public transport, theatres and in other places of entertainment.—Standard Telephones & Cables, Ltd., Connaught House, 63, Aldwych, London, W.C.2.

SPEEDMASTER. No. 673,790. Class 11. Electric torches; lamps for motor vehicles, and parts included in Class 11 of all such lamps; and vehicle reflectors and anti-dazzle devices for motor vehicle lamps.—Notek Electric Co., Ltd., 23, London Road, Bromley, Kent.

**24th August**

CREED.—No. 659,189. Class 9. Telegraphic instruments and apparatus.—Creed & Co., Ltd., Telegraph House, Cherry Orchard Rd., Croydon.

STROBOFLASH, STROBOTORCH and STROBOFLOOD.—Nos. 660,027-9. Class 9. Flashlight apparatus for measuring the speed of rotating, reciprocating and vibrating bodies and for observing the operations of such bodies.—Dawe Instruments, Ltd., Harlequin Avenue, Great West Road, Brentford, Mddx.

STANTEL.—No. 674,404. Class 9. Electric cables, condensers, resistances, temperature indicators, temperature regulators, electrical control apparatus included in Class 9, electric current rectifiers, detectors and amplifiers for electric currents and voltages, electric discharge tubes (not for lighting purposes), radio, television and telegraphic apparatus, piezo-electric crystals and piezo-electric apparatus.—Standard Telephones & Cables, Ltd., Connaught House, 63, Aldwych, London, W.C.2.

MULTICON.—No. 674,981. Class 9. Telephonic apparatus.—V. J. Hadley and N. C. Hadley trading as Hadley Sound Equipments, 587-9, Bearwood Road, Smethwick.

CUTRODE.—No. 675,351. Class 9. Cutting electrodes composed of metal.—Eutectic Welding Alloys Corporation, New York. Address for service, c/o W. H. A. Thiemann, 14-18, Holborn, London, E.C.1.

WELLA.—No. 669,586. Class 10. Caps, footwear, mittens and masks, all electrically heated and for use in treating defects in the body.—Wella Rapid, Ltd., 5-6, Eden Street, London, N.W.1.

MICROPAK.—No. B675,403. Class 10. Hearing aids for the deaf, and parts included in Class 10.—Allen & Hanburys, Ltd., Three Colts Lane, Bethnal Green, London, E.2.

# CONTRACT INFORMATION

**ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK**

## Contracts Open

*Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.*

**Argentina.**—BUENOS AIRES.—11th October. Hydro-electric plant at Sanagasta. (C.R.E. (I.B.) 22892/49. Ten/586.)*

**Australia.** — MELBOURNE. — 9th November. State Electricity Commission of Victoria. Steel framed workshop and stores buildings. (See this issue.)

**Bath.**—Education Committee. Electrical installation in schools. (See this issue.)

**Bideford.**—17th September. General public lighting. Particulars from the borough surveyor, Town Hall.

**Birmingham.**—12th September. Markets and Fairs Committee. Electrical installation at Smithfield Market. (12th August.)

29th September. Public Works Committee. Electrical installations, central heating, hot water supply and communal laundry installations in four blocks of flats. (19th August.)

**Docking.**—20th September. R.D.C. Wiring 38 dwellings on three sites. Particulars from E. E. Gibson, housing officer, Station Road.

**Edinburgh.**—30th September. North of Scotland Hydro-Electric Board. Lighting, heating and auxiliary cabling installations at Grudie Bridge power station. (See this issue.)

**Halifax.**—17th September. Town Council. Electrical works in connection with the conversion of Brearley House, Burnley Road, Luddenden Foot, into residence for aged persons. Borough engineer, Crossley Street.

**India.**—NEW DELHI.—20th September. Directorate General of Industries and Supplies. High frequency transmitters. (C.R.E. (I.B.) 23536/49. Ten/617.)*

**New Zealand.**—WELLINGTON.—29th September. Post and Telegraph Department. Telephone cable. (C.R.E. (I.B.) 23571/49. Ten/616.)*

State Hydro-Electric Department. 29th November. 50kV and 110kV outdoor switchgear. 6th December. 66kV and 50kV outdoor switchgear. (C.R.E. (I.B.) 23087/49. Ten/605.)*

31st January. State Hydro-Electric Department. Four 3,333 kVA transformers. (C.R.E. (I.B.) 23791/49. Ten/618.)*

**Preston.**—10th September. Estates and Housing Committee. Electrical installations in 300 houses. (See this issue.)

**Slough.**—9th September. Corporation. Street lighting equipment. (26th August.)

**South Africa.**—PRETORIA.—17th October. City Council. 33kV and lower voltage cables and accessories. (26th August.)

**Southern Rhodesia.**—UMTALI.—12th October. Municipality. 11,000 V cable and joint boxes and trifurcating boxes. (C.R.E. (I.B.) 22310/49. Ten/590.)*

**Southport.**—12th September. Corporation. Sodium street lighting system. (See this issue.)

**Uruguay.**—MONTEVIDEO.—10th October. Administracion Nacional de Combustibles Alcohol y Portland. Supply of 12,000 electric lamps. (C.R.E. (I.B.) 23844/49. Ten/621.)*

**Weymouth & Melcombe Regis.**—12th September. Town Council. Electrical installations in forty-three dwellings on the Westhaven estate, and four houses at Radipole Lane. Borough engineer, 6, Pulteney Buildings.

* Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

## Orders Placed

**Fort William.**—Corporation. Electrical work in connection with thirty-three houses in course of erection on the Claggan site (£2,587).—H. S. Russell, Fort William.

**London.**—L.C.C. Electrical installation at Colls Road School, Peckham.—Alpha Manufacturing & Electrical Co., Ltd.

Metropolitan Water Board. Two electrically driven propeller-type pumps and appurtenant works at the Walton Works (£15,835).—Vickers Armstrongs.

Air Ministry, London. Fluorescent lighting fittings (extension of contract for a further period of twelve months from 1st August, 1949).—Queensbury Engineering Co.

**Warwickshire.**—County Council. Electrical installations in the Market Hall (Museum Building), Warwick (£356).—Electrical Installations, Ltd.

**Wimbledon.**—Borough Council. Stage lighting improvements at Public Hall (£1,120).—Strand Electric & Engineering Co.

**Wood Green.**—Borough Council. Street lighting improvement scheme (£6,889).—Eastern Electricity Board.

## Contracts in Prospect

*Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.*

**Barrow-in-Furness.**—Houses (156), Ormsgill site, for T.C.; borough engineer.

**Birmingham.** — Girls' grammar school (£180,000) Bartley Green, for T.C.; education architect, 74, Broad Street.

**Birmingham.**—Dwellings (264), Great Francis Street, Duddeston and Nechells, for Public Works Committee; H. J. Manzoni, city engineer, Civic Centre.

**Blackpool.**—Cinema, Caunce Street and Collingwood Avenue; A. Hall, Farnholme, Moorland Road, Poulton-le-Fylde.

**Bury.**—Secondary modern school, at Owlerbarrow for T.C.; J. Hobson & Sons, Ltd., Newark Street, Nottingham.

**Chepstow.**—Cornish unit houses (82), Hardwick Court; A. Gill, clerk to U.D.C., Gate House.

**Chichester.**—Additional offices at County Hall (£23,000) for West Sussex C.C.; county architect.

**Chilton (Berks.).**—County primary school; county architect, Wilton House, Parkside Road, Reading.

**Colwyn Bay.**—Houses (42), Mochdre; N. S. Jeffrey, borough engineer, Town Hall.

**Coventry.**—Primary school, Courthouse Green, for E.C.; A. H. Gardner, architect, 11, Eaton Road.

Factory and offices, Torrington Avenue; C. E. F. Nash, Fleet Street.

**Darlington.**—Houses (78), and flats (32), Haughton site north; E. A. Tornbohm, borough architect, Central Buildings.

**Doncaster.**—Factory, store, etc.; Heath & Smith, mineral water manufacturers, 3, Cleveland Street.

Residential block at the Training College; W. W. Thomas, Education Offices, Wood Street.

**Dover.**—Houses (100) and flats (67), Buckland Valley Estate, for T.C.; borough engineer.

**Durham.**—Houses (64), at Sherburn for the R.D.C.; direct labour.

**Felling-on-Tyne.**—Offices, Stoneygate Lane for the International Paint Co., Ltd.; own architects.

**Hastings.**—Police headquarters, for T.C.; borough engineer.

**Hyde.**—Houses (90), Wych Fold Estate, for T.C.; borough surveyor.

**Leeds.**—Houses (52), at Newton Lodge for T.C.; R. A. H. Livett, housing director.

**London.**—CAMBERWELL.—Flats and maisonettes (29), East Dulwich Road, for B.C.; borough engineer.

MARYLEBONE.—Showrooms, offices, etc., 95/97, Mortimer Street; Lewis Solomon & Son, architects, 21, Bloomsbury Way, W.C.1.

SOUTHWARK.—Warehouse premises, Hayles Street; Cemolite, Ltd., 2, Church Road, Mitcham.

WESTMINSTER.—Methodist church hall, Vauxhall Bridge Road; Houchin, Harrison & Stevens, architects, 8, Gt. James Street, W.C.1.

FINCHLEY.—Flats (84), Red Lion Hill, N.2; Borough Housing Department, The Avenue, Regents Park Road, N.3.

**Merthyr Tydfil.**—Works, for Merthyr Ceramics, Ltd.; Sir R. McAlpine and Sons, Ltd., builders, 80, Park Lane, London, W.1.

**Newcastle-on-Tyne.**—Central clinic, City Road for the City Council; city architect (Education Section), 31, Northumberland Road.

Factory and offices, Brinkburn Street for Walter Dix and Co., Ltd.; J. M. Angus, architect, Hanover Square.

Laboratory extensions, Shot Factory Lane for Associated Lead Manufacturers, Elswick Lead Works; own architects.

**Nottingham.**—Reconstruction of wing of Technical College; contractors, J. Crawley, Ltd.

**Ossett.**—Traditional houses (36), Love Lane; B. Freeman, town clerk, Town Hall.

**Penistone.**—Houses (40), Park Avenue site; Noel Heppenstall, architect to R.D.C., 135, Armitage Road, Milnsbridge, Huddersfield.

**Pensarn.** — Permanent children's camp (£30,000), for Cheshire C.C.; county architect, The Castle, Chester.

**Peterborough.**—Extension to diesel engine factory, Oxney Road; F. Perkins, Ltd., Queen Street.

**Plymouth.**—Factory, Regent Street and Hampton Street; Goodbody-Mathews, Ltd., Church Road, Plymstock.

**Portsmouth.**—Factory, Fratton, for Displaced Persons Employment Corpn., Ltd.; Hawkins Bros. (Gosport), Ltd., builders, 126, Forton Road, Gosport.

**Reading.**—Houses (74), Whitley Wood Road, for T.C.; T. Cook & Son, Ltd., builders, 11, Holmes Road.

**Ripley.**—Houses (56), in three schemes, Elms estate; W. E. Clark, U.D.C. surveyor, Town Hall.

**Rugby.**—Permanent houses (194), Newbold Glebe estate, section 2; Collins & Britton, architects, 39, Bennett's Hill, Birmingham.

**Scarborough.**—Indoor swimming baths for the T.C.; borough engineer.

**Southampton.**—Infants' school (360 places), Tanner's Brook; R. R. H. Meggeson, town clerk, Civic Centre.

**Southport.**—Houses (24), at Heathfield Road site for T.C.; builders, Morris Bros. Estates (Southport), Ltd., Carr Lane.

Extensions to Technical College (£109,000), for E.C.; H. T. Seward, architect, 16, Princess Street, Manchester.

Conversion of Hesketh Park Hydro, Southport, to convalescent hospital for Regional Hospital Board, Liverpool.

**South Shields.**—Houses (20); borough engineer.

**Stamford (Lincs.).**—Second storey to the nurses' home at Stamford Hospital; plans by F. J. Fenton, Broad Street.

**Stockton-on-Tees.**—Girls dept., at Oxbridge Avenue New Grammar School for Durham C.C. (£90,000); Wimpey and Co., Ltd., builders, Newcastle-on-Tyne.

Transport depot for the T.C. (£225,000); borough engineer.

**Stratford-on-Avon.**—Married quarters (189), Long Marston Depot, for War Dept.; chief engineer, Western Command, Blacon Point House, Chester.

**Sunderland.**—Office additions, Waterworks Road; G. T. Brown and Son, architects, 51, Fawcett Street.

**Swansea.**—Extensions to works; United Kingdom Chemicals, Ltd., Port Tennant Works.

**Torquay.**—Extensions to Torbay Hospital, for Board of Management; secretary.

**Tottington.**—Secondary school (£126,767); G. Noel Hill, county architect, County Offices, Preston.

**Truro.**—Maisonettes (60), Treliske, for T.C.; Selleck, Nicholls & Co., Ltd., builders, East Hill House, St. Austell.

**Wallsend.**—Cinemas, shops and car park on the Coast Road for North-Eastern Cinemas de Luxe, Ltd.; E. M. Lawson, architect, Barras Buildings, Barras Bridge, Newcastle-on-Tyne.

**Watford.**—Dwellings (42), Green Lane, Oxhey; Dawe & Carter, architects to R.D.C., 83, High Street.

**Wellingborough.**—Health clinic (£35,000), for Northants C.C.; county architect, County Hall, Northampton.